Swedish Agency for Marine and Water Management

Regulation (EU) 2017/1004 of 17 May 2017of the European Parliament and the Council

on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008

Commission Implementing Decision (EU) 2019/909 of 18 February 2019

establishing the list of mandatory research surveys and thresholds for the purposes of the multiannual Union programme for the collection and management of data in the fisheries and aquaculture sectors

Commission Delegated Decision (EU) 2019/910 of 13 March 2019

establishing the multiannual Union programme for the collection and management of biological, environmental, technical and socioeconomic data in the fisheries and aquaculture sectors

Commission Implementing Decision (EU) 2016/1701 of 19 August 2016

laying down rules on the format for the submission of work plans for data collection in the fisheries and aquaculture sectors.

Commission Implementing Decision (EU) 2018/1283 of 24 August 2018

laying down rules on the format and timetables for the submission of annual data collection reports in the fisheries and aquaculture sectors.

Sweden Annual Report for data collection in the fisheries and aquaculture sectors

2021

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CONTENTS

Text Box 1C: Sampling intensity for biological variables

General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, of the Annex of the Delegated Decision (EU) 2019/910 and Chapter I of the Implementing Decision (EU) 2019/909 on the multiannual Union programme; and Article 2, Article 4 paragraph 1 and Article 8 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report.

BALTIC SEA

1. **Evidence of data quality assurance**

Below is a short description of the methodology used in the different major sampling types.

Surveys: All Swedish surveys in the Baltic listed in Table 1G are internationally coordinated and follow the established manuals and protocols and are conducted by experienced staff onboard. All surveys in 2021 was conducted with R/V Svea except Swedish Sound Survey which was conducted with Hålabben. All surveys were undertaken despite Corona pandemic. Onboard Svea and Hålabben the electronic data capture system "Sve-reg" was used for register data on catch and biological information. All information that has traditionally been recorded on paper was typed into the "Sve-Reg" system and was successfully uploaded to the National Database (FD2) after the surveys. National quality checks in FD2 are performed (see details in Table 5A). Length-age and length-weight relationships are plotted to find outliers. Data is also screened and checked through ICES DATRAS before uploading.

Sea sampling: Sweden is in general moving towards probability sampling and is sampling the main fisheries in Sweden. The idea behind is to have a list of vessels that are obtained from last year´s fishing pattern and a number of vessels are randomly selected from the list and the skippers are contacted by mail and are asked to contact the sampling coordinator at SLU Aqua in order to decide on the details for the trip to be sampled. In general, two trained observers are sorting the catch, register total weight by species and length measuring both landed part and the part that is discarded. Subsampled when needed. Some species from the discarded part are sampled for age reading and individual length and weight.

The data is recorded on paper protocols for most sampling types and thereafter registered in the database FD2 and checked. Some fisheries are registered using electronic protocols ("E-reg"). National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks on trip, haul, catch and individual level. For most data collected within sea sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, typical values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

Market: Sweden is applying probability sampling. From each vessel, the first landing is sampled and one box from each size category is selected. From each size category, all fish are length measured; a specified number of individuals are sampled for age, length and weight. From sampled vessels a copy of the sales notes is collected, which make the match with the logbook easier at a later stage. National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks. For most data collected within market sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, typical values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

For salmon, no sampling of the commercial fisheries is planned on an annual basis. This is according to end user needs, since these data are not included in the stock assessment models. In the fishery-independent sampling of salmon smolts, data on biological variables are collected, see Text Box 1E. For sea trout, there is no sampling including biological variables.

2. Deviations from the Work Plan

In 2021, all sea sampling programs were affected by Covid –19. Also, the cod fishery being subjected to significant quota reductions and other management measures affected the fishery and therefore also the sampling. Data preparations for the assessment working groups in 2022 have therefore, to some extent, been affected.

In Table 1C, number of individuals planned for sampling is based on a rounded two-year average (2017-2018) for mainly all data sources. Detailed short explanations for deviations are listed in "AR comment" in Table 1C.

Some significant under achievement for sampling 2021 were:

Herring SD 22-24: Less than 10 fishing trips was conducted in the fishery in the area, which made the sampling plan impossible to follow. The fishery has changed towards passive gears and to area SD 23.

Cod SD 22-24: Deviation explained by the cod fishery being subjected to significant quota reductions and other management measures [COUNCIL REGULATION (EU) 2020/1579 of 29 October 2020] as well as implications of Covid -19. Only SD 23 has been sampled close to plan.

General reasons for under- and over-sampling:

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These guidelines were followed and the actual sampled number is therefore dependent on the amount of catch, e.g. if only very few length classes are caught during the survey, the number of individuals sampled will end up being less than average and seems like it is under-sampled compared to planned numbers. The opposite could also happen, if more length classes appear compared to the reference period, it seems like it is over-sampled.

The deviations for eel in area 22-32 commercial sampling (underachievement) is due to restrictions in the fishing ban and also difficulty finding fishermen to provide samples.

3. Actions to avoid deviations

Systematic work to improve sampling design for all sampling types will generally improve sampling design and input data to assessment. Other actions to avoid under-sampling is to correct errors in planned numbers in future WPs. Where sampling is planned according to number of trips instead of number of individuals, there will still be results that looks like it´s under-sampled but it´s not. The situation of decreasing abundance and fewer length classes for some stocks are reflected as under-sampling. New sampling methodologies for sampling of pelagic stocks are under development and will improve the quality of the data and is an action to avoid under-sampling.

For herring in SD22-24 our sampling will target passive gears within area SD 23 in future sampling plans to adapt to the change in fishing pattern.

The restrictions in cod fishery will have major implications on sampling even in the future as long as the restrictions exists.

NORTH SEA & EASTERN ARCTIC

1. **Evidence of data quality assurance**

Below is a short description of the methodology used in the different major sampling types.

Surveys: All Swedish surveys in area IIIa listed in Table 1G are internationally coordinated and follow the established manuals and protocols and are conducted by experienced staff onboard. All surveys in 2021 was conducted with R/V Svea and was undertaken despite Corona pandemic. Onboard Svea the electronic data capture system "Sve-reg" was used for register data on catch and biological information. All information that has traditionally been recorded on paper was typed into the Sve-Reg system and was successfully uploaded to the National Database (FD2) after the surveys. National quality checks in FD2 are performed (see details in Table 5A). Length-age/weight relationships are plotted to find outliers. Data is screened and checked through DATRAS before uploading.

Sea sampling: Sweden is applying probability sampling. Main fisheries in Sweden are sampled. A list of vessels is obtained from last year´s fishing pattern and a number of vessels are randomly selected from the list and the skippers are contacted by mail and are asked to contact the sampling coordinator at SLU Aqua in order to decide on the details for the trip to be sampled. In general, two trained observers are sorting the catch, register total weight by species and length measuring both landed part and the part that is discarded. Subsampled when needed. Some species from the discarded part are sampled for age reading and individual length and weight.

The data is recorded on paper protocols for most sampling types and thereafter registered in the database FD2 and checked. Some fisheries are registered using electronic protocols (E-reg). National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks on trip, haul, catch and individual level. For most data collected within sea sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, *typical* values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

Market: Sweden is applying probability sampling. From each vessel, the first landing is sampled and one box from each size category is selected. From each size category, all fish are length measured; a specified number of individuals are sampled for age, length and weight. From sampled vessels a copy of the sales notes is collected, which make the match with the logbook easier at a later stage. National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks. For most data collected within market sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, typical values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

For salmon, only number (not biological data) of individuals are used in stock assessment. This data is collected from monthly fishing journals.

2. **Deviations from the Work Plan**

In 2021, Covid –19 affected the sampling in all quarters. In quarter three and four some sampling could start with measures introduced for observers to get onboard (eg Covid testing). Data preparations for the assessment working groups in 2022 has therefore, to some extent, been affected.

In Table 1C, number of individuals planned for sampling is based on a rounded two-year average (2017-2018) for mainly all data sources. Detailed short explanations for deviations are listed in "AR comment" in Table 1C.

Significant under achievement for sampling 2021

Nephrops (FU 3 and FU 4): Deviation explained by impacts and instabilities caused by covid-19 pandemic and no sampling was possible to conduct in quarter 1 and 2.Vessels fishing for Nephrops are usually small and fishermen are usually older. With respect to the covid restrictions, observers onboard these small vessels had to be on voluntary basis and was only possible in Q3 and Q4 and sampling level was possible only on a lower level than planned.

General reasons for under- and over-sampling:

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These guidelines were followed and the actual sampled number is therefore dependent on the amount of catch, e.g. if only very few length classes are caught during the survey, the number of individuals sampled will end up being less than average and seems like it is under-sampled compared to planned numbers. The opposite could also happen, if more length classes appear compared to the reference period, it seems like it is over-sampled.

3. Actions to avoid deviations

Systematic work to improve sampling design for all sampling types will generally improve sampling design and input data to assessment. Other actions to avoid under-sampling is to correct errors in planned numbers in future WPs. Where sampling is planned according to number of trips instead of number of individuals, there will still be results that looks like it´s under sampled but it´s not. The situation of decreasing abundance and fewer length classes for some stocks are reflected as under-sampling. New sampling methodologies for sampling of pelagic stocks are under development and will improve the quality of the data and is an action to avoid under-sampling.

As soon as the pandemic situation improves the sampling onboard vessels can get back to follow the plan.

SECTION 1: BIOLOGICAL DATA

Text Box 1D - Recreational fisheries

General comment: This box fulfills paragraph 2 point (a) (iv) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 3 and Article 4 paragraph 1 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report. This box is intended to provide information on the design, implementation and analysis of all components of sampling schemes/ surveys that are listed in Table 1D.

1. Description of the target population

The National Swedish postal questionnaire

A postal questionnaire was sent to randomly selected permanent residents in Sweden, age 16-80 years. The survey consists of 22 000 questionnaires each year. The questionnaire was sent at three occasions during the year with questions regarding fishing activities and targeted species in the most recent four months. The questionnaire does not target fishing carried out by visitors to Sweden but will give information on the recreational effort, catches gear use and expenditures of Swedish residents which comprise most of the population of fishers. In particular, the

questionnaire will be evaluated as a means of cost-efficiently estimating catch and effort in regions not yet covered by on-site surveys (i.e. subdivisions 25 and 27).

Salmon

In the annual recreational river catches survey, the recreational fishermen targeting salmon (and sea trout) in Swedish salmon rivers are the target population. According to end-user needs, the trolling survey (targeting recreational fisheries in the open sea) has been conducted from once every four years ranging to subsequent years (as the latest surveys in 2019-2020) and the trapnet survey (targeting recreational coastal fisheries along the coast) has been conducted every 4-6 years.

Eel

Recreational fishing targeting eel is forbidden in Sweden, no sampling is conducted.

Since 2007, eel fishing is only allowed for commercial fishers with a specific eel fishing permit. However, upstream three insurmountable obstacles in rivers, eel fishing is allowed for people with fishing rights (land-, and water owners etc.), but it is illegal for them to sell the catch. SwAM estimates the extent of legal recreational eel fishery to be of minor importance. Which population(s) that might be fished and to what extent is largely unknown as there are no legitimate claims for this fishing to be reported to any agency.

2. **Type of survey**

The National Swedish postal questionnaire

The national Swedish postal questtionnaire is a postal survey with randomly selected permanent residents in Sweden, age 16-80 years. The survey uses a panel approach, which means respondents can be sampled up to four times. The panel approach was adopted to account for non-response bias and to increasing the number of answers.

Salmon

In the annual recreational river catches survey, information on river catches are yearly collected from all Swedish salmon rivers through questionnaires and river "census" data. This census data is gathered in collaboration with county administration boards and local fisheries organizations, which collect catch data from "all" recreational fishermen in the rivers.

However, the methodology for collecting catch statistics differs between and within rivers due to e.g. differences in size of the rivers, the organization of the fishery and the number of fishing tourist, and include e.g. questionnaires, web site reports and requests to local contact persons. The catch data from each contact person have in turn been collected in a variety of ways (e.g. "mandatory" catch reporting systems, voluntary catch reporting systems, estimates). Data quality highly depends on local interest, size of the river and on how the river fishery is organized.

The trolling survey has been conducted from once every 2-4 years ranging to subsequent years (as the latest surveys 2019-2020). It is focusing on the trolling fisheries in the Main Basin (SD 25–29) and where different methods still are evaluated and developed.

The latest study (2020), was designed as a randomized onsite survey where harbour days were sampled in the two most important harbours for Swedish trolling fisheries. All boats identified as

trolling boats were counted and the goal was to interview one person on each boat to collect information on catches of salmon (retained and released).

The coastal trapnet survey is conducted every 4-6 years. The latest was run in 2021 and it focused on the fisheries in Gulf of Bothnia (SD 30 and SD 31). Where information on the geographical position of eventual recreational gears county by county was collected by contacting earlier known recreational fishermen and active commercial fishermen.

3. Data Quality

<u>National Swedish postal questionnaire</u>

Work on data quality is an ongoing process. Each year we evaluate the survey with regards to different aspects, where data quality is included. The data quality is overall good, although the results from the survey are often accompanied by large uncertainties yielding large confidence intervals.

<u>Salmon</u>

Generally, work on data quality is making progress. However, when regularly evaluating data quality in the recreational sampling, there are several issues, where it is more or less impossible to make further improvements. E.g. non-responses and refusals are not recorded for the river catches as this survey largely differs between and within rivers and depends on voluntary participation as no obligations to report recreational catch exist due to Swedish legislation.

4. Data analysis and processing

<u>National Swedish postal questionnaire</u>

Data management is mainly done by Statitics Sweden, more ad-hoc data management are done at SwAM. Data analysis are done by SwAM. Data management and analysis are based on known and robust models.

<u>Salmon</u>

Generally, work on data analysis and processing is also making progress and one example is the documentation of the editing and imputation methods that is currently being compiled.

WGBAST and WGNAS evaluate precision of the estimates and uncertainty about catch estimates are included in the models.

SECTION 1: BIOLOGICAL DATA

Pilot Study 1: Relative share of catches of recreational fisheries compared to commercial fisheries

General comment: This box fulfils paragraph 4 of Chapter II of the Annex of the Implementing Decision (EU) 2019/909 on the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (a) of the Implementing Decision (EU) 2016/1701 on the format of the WP.

BALTIC SEA

A pilot study to quantify Swedish recreational catches of cod and associated by-catches was executed in ICES subdivision 23-24 during 2017-2019. The pilot study explored several survey techniques including aerial observations, hydrophone and camera sampling of activity patterns, snowball survey of questionnaire and on-site sampling methods. The study concluded that a separation of effort sampling, by passive counting (cameras), and on-site creel sampling of catch rates was most efficient to produce precise and accurate estimates of total catch and size and age composition of catches. The study further concluded that the major contribution of recreational catches of cod in the specified area was taken by the tourboats of the for-hire sector in subdivision 23. Hence it is proposed that the census of voluntary logbooks and on-board sampling of catches on the tourboats is continued and incorporated as a permanent contribution to the biological sampling of cod catches from the recreational sector.

1. Aim of study

Sampling in ICES subdivision 23 and 24 on catches and effort of recreational fisheries with focus on cod caught by the for-hire sector in the Western Baltic. The aim of the study is to get census data of catches and to collect size-based catch (including released fish) and effort information on cod but data on all species (including by-catch) will be collected.

2. Duration of study

The study on collecting diary information of catches from tourboats was initiated in subdivision 23 in 2010. During 2017-2019 it was included as one of the elements of the pilot study to collect catch information for the entire recreational fishing sector for cod in the Western Baltic. The diary and onboard sampling of tourboats in the Western Baltic will continue during 2020 - 2021 as a permanent contribution to the biological sampling of cod catches from the recreational sector. Estimates for subdivision 23 by quarter will be available for assessment needs on a yearly basis.

3. Methodology and expected outcomes of study

In the study, recreational fishery is defined as all fishing activities carried out by those without a commercial fishing license. The study will encompass two main components: a) the adjustment and extension of a yearly nation-wide postal questionnaire that presently is sent to approximately 22 000 randomly selected permanent residents in Sweden and b) the continuation of the current sampling of tourboats in Western Baltic. Questionnaires are often used for estimating total effort and socio-economic-related parameters. On-site data sampling can be used to validate and improve cost-efficiency of off-site data sampling but also vice versa. The on-board sampling provides estimates of catch rates and size (and age) composition of caught and released fish in Western Baltic.

A. The postal questionnaire

A postal questionnaire will be sent to randomly selected permanent residents in Sweden, age 16-80 years. The minimum number of questionnaires that will be sent is 10 000. Statistical analyses will

be carried out to analyse the impacts of increasing the number of questionnaires and adjusting their spatial coverage as this is necessary to attain higher precision in the estimates of catches from target stocks at subdivision level. The questionnaire will be sent at three occasions during the year with questions regarding fishing activities and targeted species in the most recent four months. The questionnaire does not target fishing carried out by visitors to Sweden but will give information on the recreational effort, catches gear use and expenditures of Swedish residents which comprise most of the population of fishers. In particular, the questionnaire will be evaluated as a means of cost-efficiently estimating catch and effort in regions not yet covered by on-site surveys (i.e. subdivisions 25 and 27).

B. The tourboat sampling

The on-site pilot collecting data from recreational fishers acting from Swedish commercial fishing-tourism vessels in subdivision 23 and 24.
The study covers recreational fishing activity of both Swedish residents and visitors to Sweden. The on-board survey provides information about the persons practicing recreational fisheries alongside quarterly estimates of catch, effort and biological data on individual fish kept (weight, length etc.) and released (numbers and species) that are necessary for the application in stock assessment. Both weekdays and weekends/holiday-periods are covered in the scheme.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

4. **Achievement of the original expected outcomes of pilot study**

In 2021, the on-site pilot collecting data from recreational fishers on tour boats was only planned to take place in subdivision 23. Due to corona restrictions, during 2021 onboard sampling was performed in quarter 4 only.

Since 2011, tourboat operators have delivered voluntary logbooks, which have constituted the main part of the data used to estimate recreational catches of cod in SD 23. Before the work with the 2022 data call, we have contacted the operators regarding the 2021 logbooks. However, despite kind reminders none of them has submitted their logbooks. Thus, unfortunately Sweden have not been able to deliver recreational catches of cod in SD 23 for 2021.

5. **Incorporation of results from pilot study into regular sampling by the Member State**

Results from pilot study is reported to ICES' expert groups (WGBFAS and WGRFS) annually.

Text Box 1E: Anadromous and catadromous species data collection in fresh water

General comment: This box fulfills paragraph 2 points (b) and (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 of the Implementing Decision (EU) 2016/1701 on the format of the WP.

General comment: This box is applicable to the Annual Report.

BALTIC SEA AND IIIA

Method selected for collecting data

Salmon and sea trout

Data collection for salmon consists of annual electrofishing surveys of juveniles (parr), trapping of out-migrating smolts and counting of ascending spawners in fish ladders in designated rivers. These rivers are spread among assessment units to comply with end-user (ICES) needs. Electrofishing and smolt counting is also undertaken in additional rivers, according to stock assessment needs. Estimates of smolt and parr abundance are made through mark-recapture experiments and repeated sampling, by traps and electrofishing, respectively. For smolts, individual length and weight are collected for all individuals, and scale samples are taken from sub-samples stratified by time of capture for age determination. The number of electrofishing sites per river varies with size/length of river and with year for non-index rivers, to cover areas of salmon reproduction. The suggested number of sites fulfills the minimum requirement for an acceptable level of certainty for each river, with respect to smolt production estimates used for stock assessment.

For salmon, data from commercial (Table 2A) fisheries in freshwater are collected from fishing log-books. Total recreational (Table 1D) river catches of salmon (in 22-31 and IIIa) and sea trout (in 22-31) will be estimated annually (enquiries, interviews, catch reports from fishing right owners). Estimates of Baltic salmon trolling catches will be carried out every second year (site studies combined with effort estimates). Recreational fisheries with trap nets will be estimated every 4th year.

Eel

Recruitment of young eels into freshwater is estimated and sampled yearly by electrofishing and by eel counters in a number of rivers. Significant numbers of recruits are artificially stocked as young eels and data on numbers and release sites are annually added to a database. Introduced yellow eel populations are monitored and sampled using either fyke nets or outlet traps. Silver eels are sampled from selected commercial fisheries in three lakes yearly. The fishing mortality and escapement of migrating silver eels is estimated annually through mark-recapture studies at three different and altered sites along the Baltic coast. As a consequence of a reduced fishing efforts and an imposed three-month closure there is an urgent need for fishery-independent methods. Such data could be collected by increasing the current tagging program and by adding acoustic tagging. Acoustic tagging has been executed in 2020 and 2021, conducted outside of DCF, and has been moved to the new Work Plan and is conducted within DCF starting 2022. A general ban of

recreational fishing for eel was introduced in 2007. Exemptions to this ban are made in some inland areas where eel is not able to contribute to spawning migration due to downstream hydro power. One designated river (Kävlingeån) has been monitored since 2019 in a full life history study, with data collected on recruits, standing stock and migrating individuals.

Were the planned numbers achieved?

Non-conformity with salmon sampling in 2020 is explained in Table 1E and below:

Salmon

River	Method	% of achievement	Explanation	Justification
River Ume/Vindelälven	Electrofishing	68	Due to high flows/flood it was not possible to electrofish all of the planned sites. In addition, a few sites were not sampled, out of diverse logistic reasons.	High flows during the field season made it impossible to electrofish in accordance with to the standardized method. Regarding the logistic problems, such as all field staff being on sick leave, the future planning needs to be improved.
River Testeboån	Electrofishing	91	Due to high flows/flood it was not possible to electrofish one of the planned sites.	High flows during the field season made it impossible to electrofish in accordance with to the standardized method.
Salmon rivers emptying in the Baltic Sea basin	Electrofishing	79	Due to high flows/flood it was not possible to electrofish one of the planned sites. Planned number of sites were be revised after WP was prepared.	High flows during the field season made it impossible to electrofish in accordance with to the standardized method. Number of sites for individual rivers may differ slightly between years to meet end-user needs within budget.

<u>Eel</u>

Most planned numbers were achieved, the planned numbers that were not reached are detailed below.

River/site	Method	% of achievement	Explanation	Justification
20 rivers in Skagerrak and Kattegatt River Basin district	Electrofishing	75	15 sites in 14 rivers are electrofished, not 20 rivers. This is according to plan.	This is not an underachievement but an error in Table 1E. Planned nos should be 15 sites (14 rivers). This has been changed in the new WP.
Göta Älv	Trap	0	The responsible County Administrative Board has been unable to find staff to manage this migration trap.	SwAM and the County Administrative Board is still working to solve the issue with finding staff. All parties are aware of the problem and the importance of this collection site.
Rönneå	Trap	0	This trap is no longer in operation.	This river has been removed from the new WP since the hydropower plant has been closed meaning that the trap is no longer in operation.
River Mörrumsån	Trap	0	The site has been reconstructed and now has a fish passage. Eel are no longer counted due to this.	This river has been be removed from the new WP since the hydropower plant has been reconstructed and eels can pass in a fishway. They are no longer counted.

Stocking in fresh-and marine waters	Register stocked numbers	18	Planned nos were not achieved due to Brexit.	Glass eel are usually purchased from England but that is no longer possible due to Brexit. Eels were instead purchased from France, but it was not possible to purchase 2.5 million.

For the coastal eel sampling, all planned numbers were achieved. The non-conformity for the east-coast sampling is not an underachievement, but an error in Table 1E; 'Planned nos should be 1 as the only survey left is the one in Barsebäck.

Text box 1F: Incidental by-catch of birds, mammals, reptiles and fish

General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910, on the multiannual Union programme; and Article 2 of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.

1. Results

Data on incidental by-catch of birds, mammals, reptiles and fish is collected through the sea-sampling programme (described in textbox 4A and table 4A). Results are presented in table 4A and table 1F. Observations of by-catches of PETS are documented in all observed trips if such bycatches occur. Sweden did, based on the outcome of a pilot study on bycatches of PETS 2017-2019, add two fisheries (gillnets in SD23 (Öresund-Baltic) and gillnets in SD21 (Kattegat)) to the sea-sampling programme. The reason for this was that the pilot study showed that these were fisheries sensitive to bycatches of mammals and birds.

Bycatches of birds and mammals are very rare in the demersal trawl fisheries and no such bycatches were observed during 2021.

Number of trips in which bycatches of birds and/or mammals were encountered in the gillnet fisheries are summarized below.

Area	SD21	SD23
No of trips in fleet	654	1759
No of observed trips	5	14
Trips with bycatch (mammals/birds)	1	5
Trips without bycatch (mammals/birds)	4	9
Great cormorant - Phalacrocorax carbo		2
Common Eider - Somateria mollissima		1
Common murre - Uria aalge		2
Harbour seal - Phoca vitulina	1	1

The majority of observed trips does not generate observed bycatches. This imply that we need to increase the coverage in sampling to generate robust rates bycatch rates. Sweden did thereby in 2020-2021 conduct a pilot study with camera monitoring on small vessels (most Swedish gillnetters are below 12 m). Results from this pilot study is described in "Pilot study 2".

2. Deviations from Work Plan

The sea-sampling programme was impacted by the covid pandemic which limited the possibilities to put observers on vessels during parts of the year. This resulted in fewer trips observed than what was planned. Planned and achieved number of trips are reported in table 4A. The pilot study with cameras could continue through the pandemic (see pilot study 2).

SECTION 1: BIOLOGICAL DATA

Pilot Study 2: Level of fishing and impact of fisheries on biological resources and marine ecosystem

General comment: This Box fulfills paragraph 3 point (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (b) of the Implementing Decision (EU) 2016/1701 on the format of the WP.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.

NORTH SEA AND EASTERN ARCTIC

1. Aim of pilot study

The aim of the pilot study is to obtain information on by-catches, primarely of birds and mammals, in the the gillnet fisheries in the Skagerrak (3aN). We will compare two methods (sea-going observers and simple camera systems) to obtain this data and discuss their strengths, weaknesses and limitations.

2. Duration of pilot study

The pilot study will be carried out during 2020-2021.

3. Methodology and expected outcomes of pilot study

Sweden did during 2017-2019 carry out a pilot study on by-caches in fisheries with gillnets and longlines in southern and central Baltic Sea and in the Kattegat. Results from this study show that by-catches of birds and mammals sometimes appear. Sea-sampling of gillnets in Öresund (SD 23) and Kattegat (3aS) have thereby been included in the WP 2020-2021. The Skagerrak (3aN), have not been monitored and is thereby the target of this pilot study.

Further, the pilot 2017-2019 showed that it was possible to monitor the gillnet fisheries with sea-going observers despite the small size of the vessels. The method is however labour intensive and not particularly effective as no by-catches were observed in most sampled trips. In order to also monitor the caught fish, two observers were needed as the hauling operation needed to be watched at all times. By-catches of harbour porpoises were rare but when they did occur the animal fell out of the net before reaching the boat in two thirds of the cases.

In 2020-2021 we intend to complement the sea-going observers with camera monitoring of the fisheries (as suggested by the fishPi2 project (MARE/2016/22). We intend to monitor the fishery in 4 different ways;

Two sea-going observers sampling randomly selected vessels in the same way as during the pilot study 2017-2019.

One sea-going observer and one portable gopro camera sampling randomly selected vessels in a similar way as during the pilot study 2017-2019.

Monitoring of randomly selected fishing trips with gopro cameras.

Monitoring of ad-hoc selected vessels (voluntarily basis) with gopro cameras.

The monitoring with cameras will be compared with the monitoring by observers and the strength, weaknesses and limitations of the methods will be discussed.

We intend to investigate:

a) If it is possible to implement statistically sound designs when using cameras. The key question is if a suffcent amount of vessels are willing to carry cameras to allow for a random sampling design.
b) If it is possible to identify species in the species groups (mammals, birds and fish) of intrest on the films obtained by the cameras.
c) If it is possible to identify by-catches (e.g. slip outs of mammals) with the cameras that are not seen by the observers.

If it is more effective to monitor by-catches of mammals, birds and fish with cameras and if/were there are trade-offs (e.g cameras more effective for some species but less effective for others).

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

4. Achievement of the original expected outcomes of pilot study and justification if this was not the case

The pilot study was impacted by the Covid pandemic as the possibilities to deploy observers at sea has been limited during large parts of 2020 and 2021. That meant that we had to focus less to compare outcomes between observer schemes and camera monitoring schemes and more to develop and implement the camera monitoring scheme itself. This development includes aspects such as

- Efforts to increase numbers of vessels accepting cameras
- Adaptations of the camera systems to meet requirements on the vessels and to improve the quality of the films
- Routines for analysis of the films, including quality assessment of films and training of staff that reads films
- Routines for improving species identifications from films
- Routines for managing and storing films and data captured from films.
- Adaptations of national database to store data captured from films in similar formats as observer data. This is done also to assure that data captured from films can be organized to meet requirements from the RDBES format.

This is ongoing progress that will continue during 2022 and were relevant also be discussed in the RCG ISSG PETS.

We also had to enlarge the geographical scope of the pilot study as the gillnet fishery in Skagerrak (IIIaN) was limited (in 2021 was only 203 trips conducted by the fleet). Most of the camera monitoring have instead been carried out in SD23 were the effort in the gillnet fisheries is larger (in 2021 1759 trips).

A main challenge for camera monitoring of the Swedish gillnet fisheries is that the vessels are small (the majority below 12 m. This require a camera system suitable for small vessels as random selection of vessels otherwise is difficult to achieve. During 2020, we thereby focused on the adaptation/development of camera systems to be used by small vessels. The objective for the camera systems have been that they i) should be easy for the fishermen to handle, ii) should be adopted to the power systems on the small vessels, iii) the films should capture potential by-catch but at the same time respect fishermens privacy as much as possible and iv) generated films should be able to be analysed with available software (eg. Anchorlab). Contracted vessels have tested three different camera systems

during the year. One of the systems meet the objectives better than the others. This system was also preferred by the most participating fishermen.

In 2021 the development of the camera systems continued but more focus were put on quality assurance of films and management of data. Substantial effort is also spent to increase the sampling coverage and to actually analyse the films.

A summary of achieved number of sampled trips within the pilot study is shown below.

Year	2020			2021		
Area	IIIaN	IIIaS	SD23	IIIaN	IIIaS	SD23
No of trips in fleet	184	723	2166	203	654	1759
No of trips filmed	6		140	22	20	280
No of trips filmed analyzed so far			9	16	11	112

All trips that have been filmed within the pilot study have not been analysed so far (as shown in the table above). This is ongoing work. We can presently, thereby, not say how many bycatches we have encountered during the entire pilot study. Species encountered are listed in the table below.

Great cormorant - Phalacrocorax carbo
Common murre - Uria aalge
Common Eider - Somateria mollissima
Harbour seal - Phoca vitulina
Harbour porpoise - Phocoena phocoena

5. Incorporation of results from pilot study into regular sampling by the MS

Sweden have, based on the outcome of the pilotproject, in the WP for 2022-2024, incorporated camera monitoring of gillnet fisheries as sampling scheme within the regular programme. The intention is to build on the work done within the pilotstudy but extend the geographical scope into the Baltic.

Text Box 1G: List of research surveys at sea

General comment: This box fulfills Chapter I of the Annex of the Implementing Decision (EU) 2019/909, on the list of mandatory surveys and thresholds, of the multiannual Union programme; and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701 on the format of the WP. It is intended to specify which reseach surveys at sea set out in the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Chapter I of the Annex of the implementing decision of the multiannual Union programme or whether it is an additional survey.

General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.

BALTIC SEA

BITS Q1 and BITS Q4 – Baltic International Trawl Survey

1. **Objectives of the survey**

To estimate cod recruitment indices, cod abundance and to follow the development of flounder and other flatfish populations in the different Sub-Divisions in the Baltic. The survey is included in Table 10 in EU-MAP.

2. **Description of the methods used in the survey**

The survey is conducted using a TV3L demersal trawl at day-time. Sweden is assigned 50 randomly selected hauls for the first quarter survey and 30 randomly selected hauls for the fourth quarter survey. For both surveys hydrographical data are collected with a CTD in connection to the trawl hauls and acoustic data are continuously recorded. Each haul is sorted and all species are recorded, length measured and weighted. For target species biological parameters are collected on fish length, age, weight, sex and gonadal maturity. In case of large catches subsampling is performed. Additional sampling like stomach content on cod and flounder, sampling of parasites from cod liver is also undertaken and from each haul marine litter are registered. The data on marine litter is uploaded to the international ICES database.

Further details are explained in the Baltic International Trawl Survey (BITS) manual:

BITS manual

In the Sound, 11 stations with one haul in each station is trawled by a small Swedish vessel (Hålabben) using a down scaled TV3 930 trawl, to 30 % of original size. Except from the small trawl, the biological sampling is following the procedure described above.
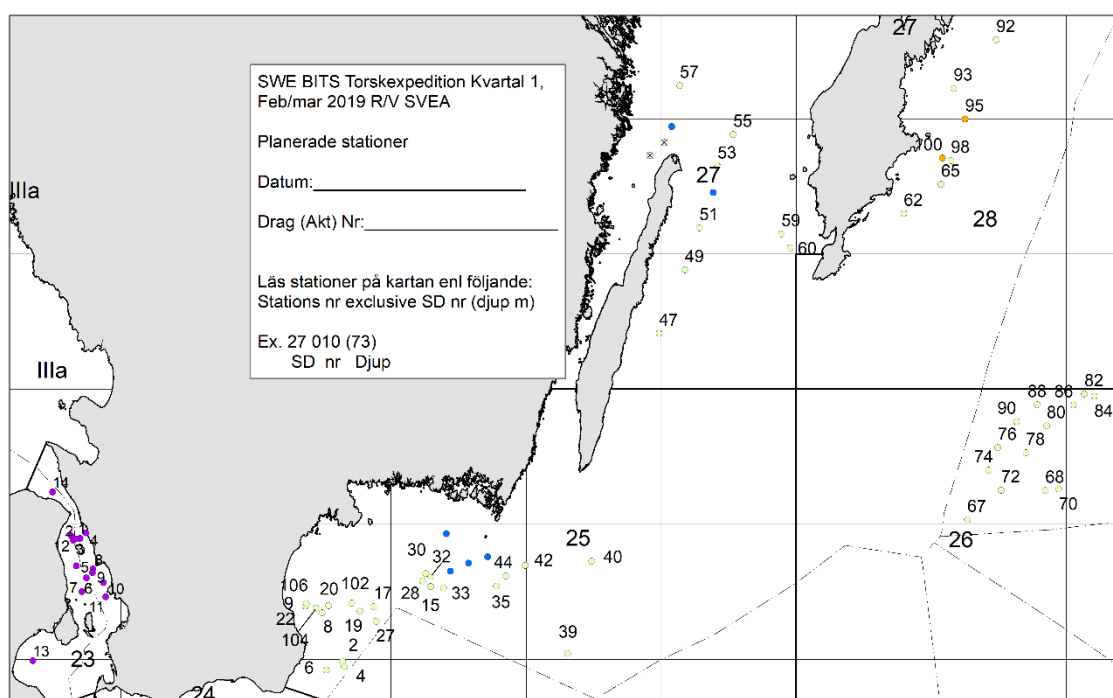
Map 1. BITS first quarter survey (2019) illustrating the approximate spatial distribution of hauls for the surveys in 2020 and 2021 Trawl stations in SD 25.26.27.28 are conducted by the new Swedish vessel Svea and trawl stations in SD 23 by the smaller vessel Hålabben.
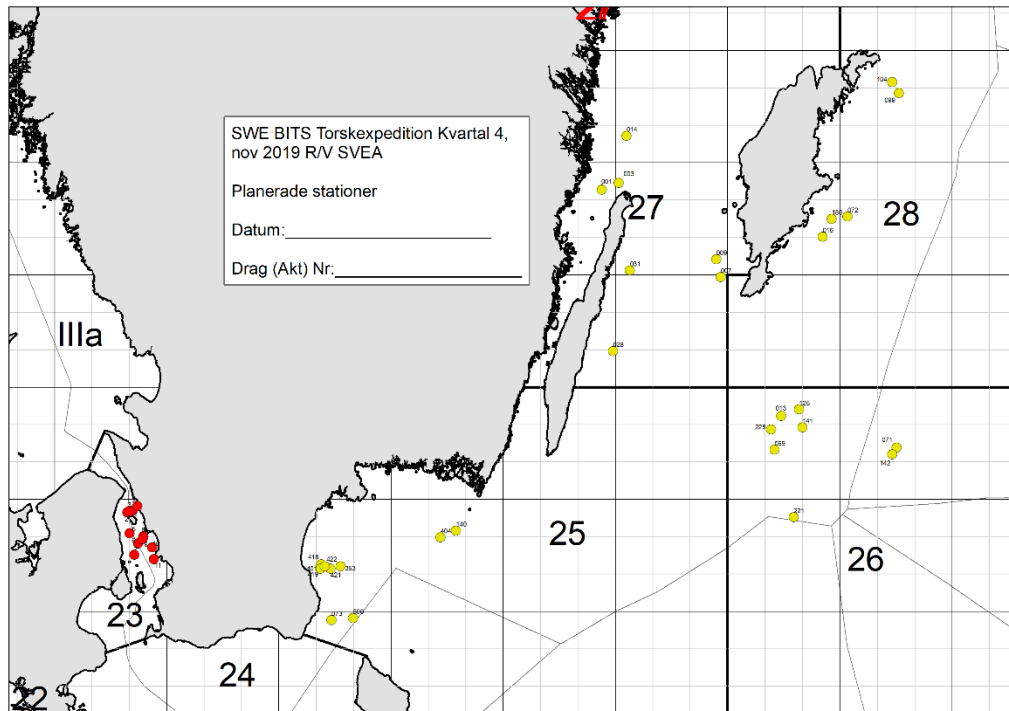
Map 2. BITS first quarter survey (2019) illustrating the approximate spatial distribution of hauls for the surveys in 2020 and 2021 Trawl stations in SD 25.26.27.28 are conducted by the new Swedish vessel Svea and trawl stations in SD 23 by the smaller vessel Hålabben

3. Coordination and participation

The new Swedish research vessel Svea will be used for the surveys in the Baltic and is complemented with R/V Hålabben in Öresund (SD23). R/V Svea will from autumn 2019 be the platform for all DCF surveys that are included in the WP. Participating Member states in the surveys are: Denmark, Germany, Latvia, Poland, Lithuania and Sweden. The BITS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) and the data are uploaded to the international ICES database DATRAS.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

There is no cost sharing agreement for this survey.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

6. Graphical representation (map) of the realized samples
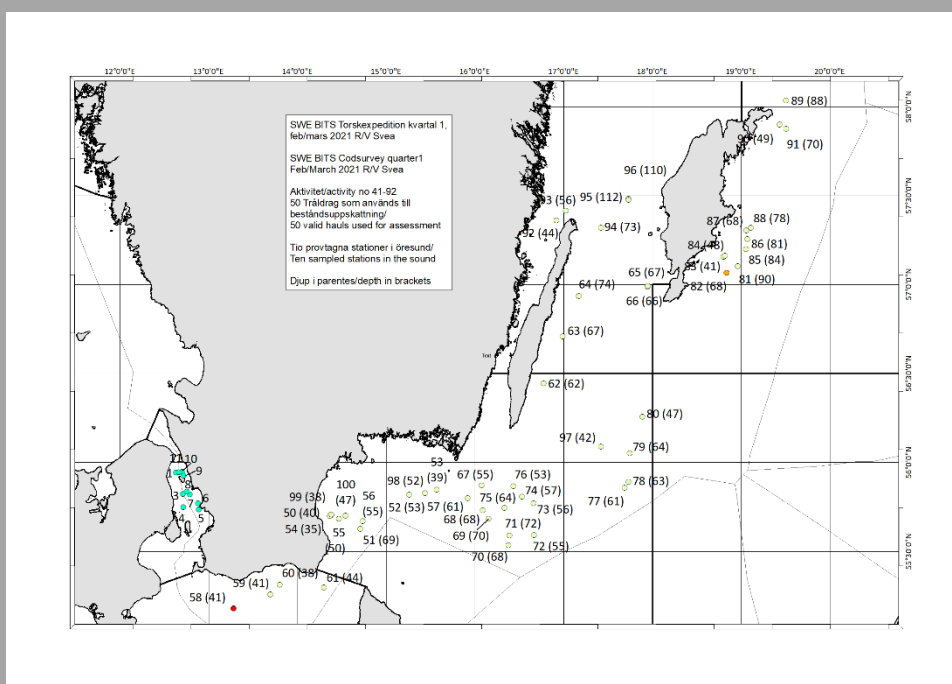
Map 1. BITS first quarter survey in 2021. 50 stations in the Baltic were conducted with Svea. 10 stations were conducted in the Sound within Sweden Sound survey using the vessel Hålabben.
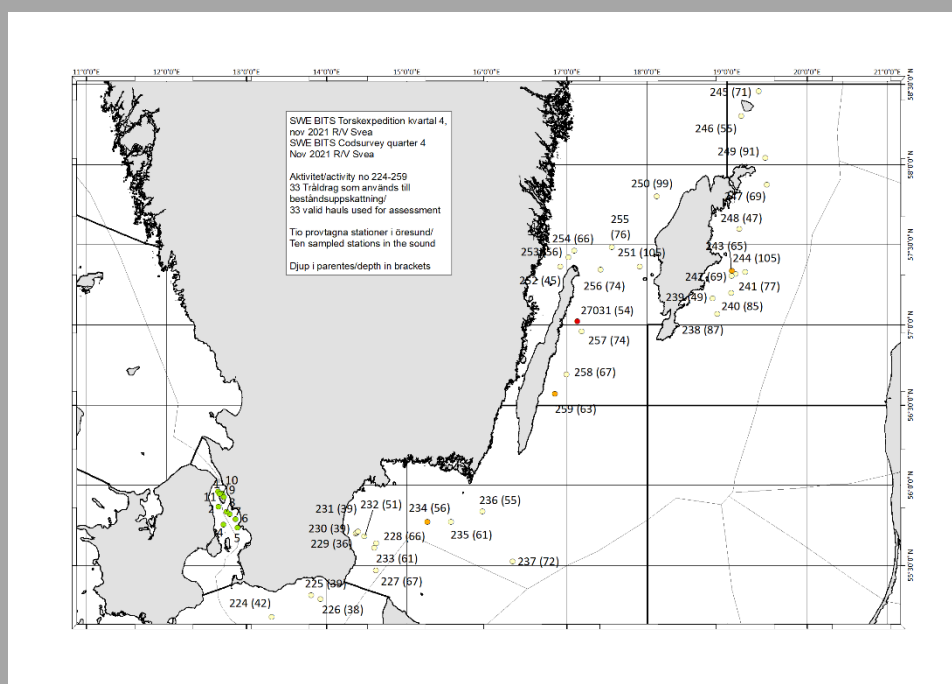
Map 2. BITS fourth quarter survey in 2021. 33 stations in the Baltic was conducted with Svea. 10 stations were conducted in the Sound within Sweden Sound survey using the vessel Hålabben.

7. Link to the latest meeting report of the coordination group

The survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS). The latest meeting report WGBIFS can be found following this link.
https://doi.org/10.17895/ices.pub.8248

8. Main use of the results of the survey

Abundance estimates WGBFAS, Data compilation WS, benchmark WS.
Marine litter is uploaded to DATRAS and used for estimation of one of the indicators in MSFD.
The information of stomach content is used in several projects and ICES groups, e.g. WGIAB, WGCOMEDA.

9. Extended comments (Tables 1G and 1H)

To clarify, Sweden Sound Survey is the name of the survey conducted in The Sound (SD 23) and follows the manual of BITS but with a downscaled TV3 trawl. The survey is coordinated with Denmark and data is uploaded in DATRAS. The data is made available for the assessment group WGBFAS.

BIAS – Baltic International Acoustic Survey

1. Objectives of the survey

The aim of the survey is to provide abundance estimates of herring, sprat and pelagic cod in the Baltic Sea. The survey is included in Table 10 in EU-MAP.

2. Description of the methods used in the survey

The survey is using a SIMRAD EK80 echo sounder with the 38kHz transducer (ES38-7) for the acoustic transect data collection and a pelagic trawl, Fotö trawl for collecting biological information. 2 hauls are made in each ICES rectangle. For each haul, all species are length measured on-board and parameters such as age, weight, and sex are analysed on herring, sprat and cod. The gonadal maturity is also analysed on herring. Sweden is responsible to cover area subdivision (SD) 27 and parts of SD 25, 26, 28 and 29. The acoustic data together with the biological information is used in the assessment models. Additional sampling on stomach content on cod is undertaken.

Further details are explained in the Baltic International Acoustic Survey (BIAS) manual:

The BIAS Manual
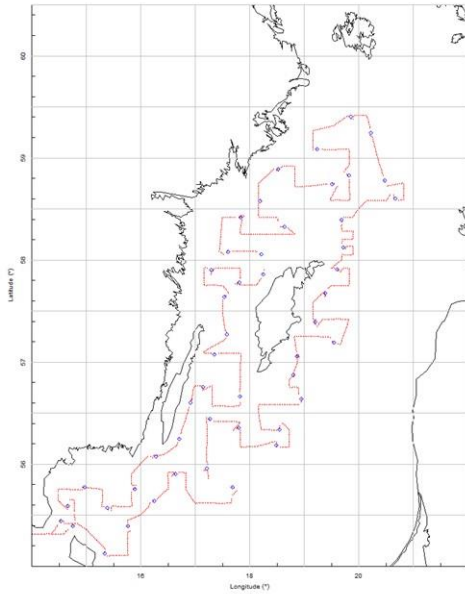
Map 3. Survey grid and trawl positions of for BIAS survey (2018), illustrating the approximate coverage of the survey in 2020 and 2021.

3. Coordination and participation

The new Swedish research vessel Svea will be used for conducting the survey The BIAS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) and the data are uploaded to the international data storage, IBAS database. Participating countries in the survey are Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

There is an agreement between Finland and Sweden, where Sweden send two staff to the Finnish part of the BIAS survey conducted in SD30. For details, see table 7C.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%.

6. Graphical representation (map) of the realized samples
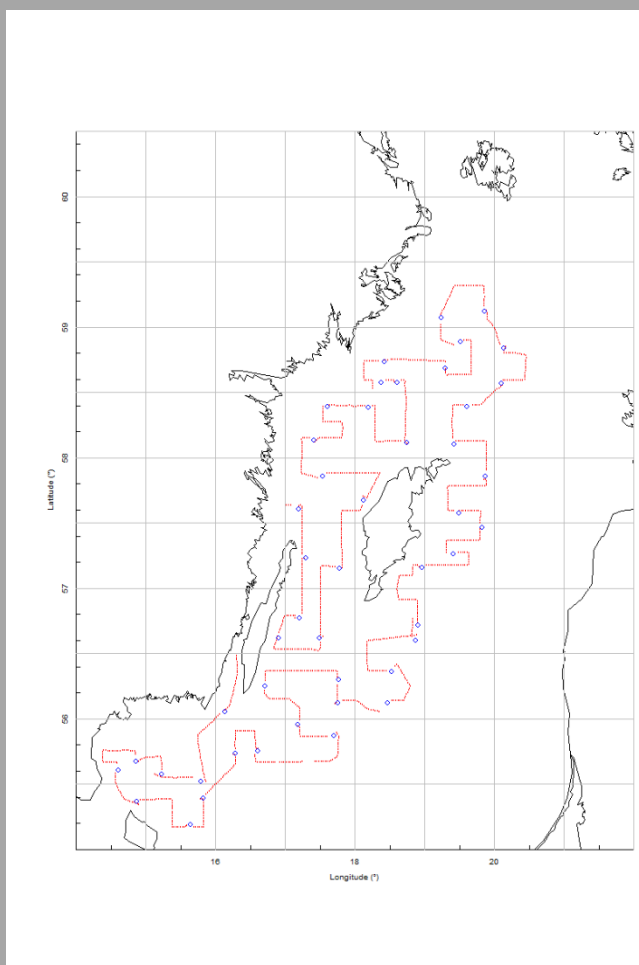
Map 3. Survey grid and trawl positions of SVEA during BIAS survey 2021

7. Link to the latest meeting report of the coordination group

The survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS). The latest meeting report WGBIFS can be found following this link.

https://doi.org/10.17895/ices.pub.8248

8. Main use of the results of the survey

The main objective of BIAS is to assess herring and sprat resources in the Baltic Sea, and produce indices. The survey will provide data to the ICES Baltic Fisheries Assessment Working Group (WGBFAS). Data compilation WS, benchmark WS.
Additionally, the data is used in a number of scientific publications and has been used for producing a LF Indicator through HELCOM. The information of stomach content is used in several projects and ICES groups, e.g. WGIAB, WGCOMEDA.

9. Extended comments (Tables 1G and 1H)

No additional comments.

SPRAS – SPRAT ACOUSTIC SURVEY

The survey is also known as BASS – Baltic Acoustic Spring Survey. The survey is included in Table 10 in EU-MAP.

1. Objectives of the survey

The aim of the SPRAS surveys is to estimate the stock indices of sprat (*Sprattus sprattus*) in the Baltic.

2. Description of the methods used in the survey

The survey is using a SIMRAD EK80 echo sounder with the 38kHz transducer (ES38-7) for the acoustic transect data collection and a pelagic trawl, Fotö trawl for collecting biological information. Two hauls are made in each ICES rectangle. For each haul, all species are length measured on-board and parameters such as age, weight, and sex are analysed on sprat, herring and cod. Sweden is responsible to cover area subdivision (SD) 27 and parts of SD 29 and SD 25. The acoustic data together with the biological information is used in the assessment models.

Further details are explained in the Sprat Acoustic Survey (SPRAS) manual:

The SPRAS Manual
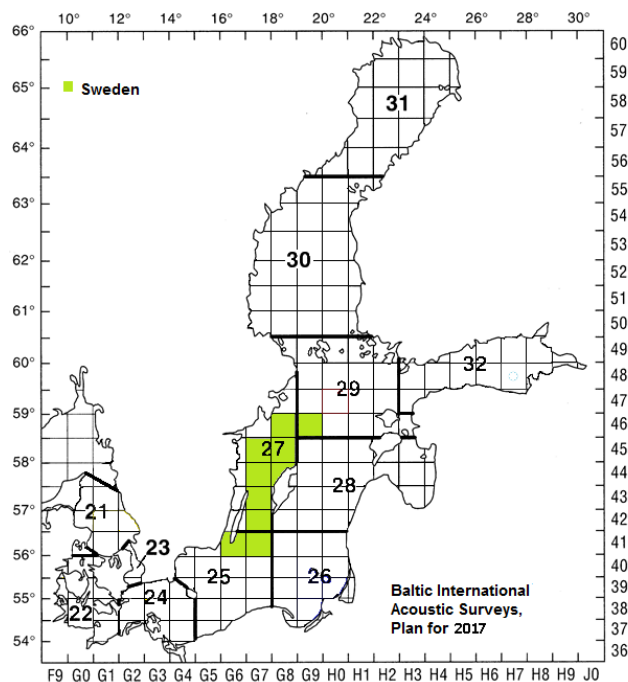
Map 4. Planned area to be covered by Sweden during the SPRAS survey 2020-2021

3. Coordination and participation

2020 will be the first year that Sweden is planning to conduct the survey and the new Swedish research vessel Svea will be used. The SPRAS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) and the data are uploaded to the international data storage, IBAS database. MS participating SPRAS survey is Poland, Germany, Estonia, Lithuania, Latvia and from 2020 also Sweden.

4. **Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**

Following recommendations of WGBIFS, each participating MS executes surveys primarily in their respective EEZs. No cost sharing is applied to this survey.

5. **Explain where thresholds apply**

Share of Union TAC for target species is above 3%.

6. **Graphical representation (map) of the realized samples**
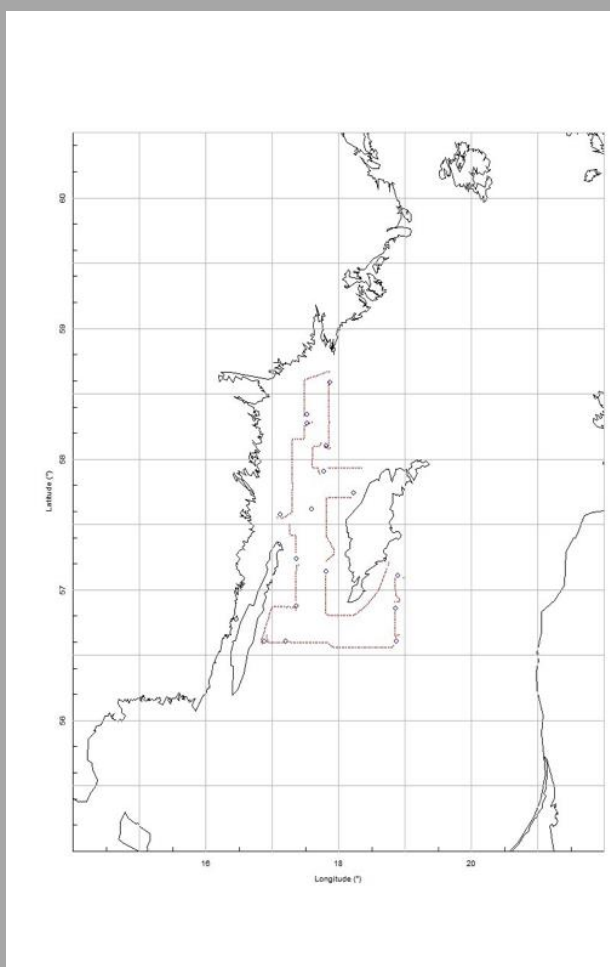
Map 4. Survey grid and trawl positions of Svea during SPRAS survey 2021

7. **Link to the latest meeting report of the coordination group**

The survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS). The latest meeting report WGBIFS can be found following these links.

Report WGBIFS

https://doi.org/10.17895/ices.pub.8248

8. Main use of the results of the survey

The main objective of SPRAS is to assess herring and sprat resources in the Baltic Sea, and produce indices. The survey will provide data to the ICES Baltic Fisheries Assessment Working Group (WGBFAS).

Additionally, the data is used in a number of scientific publications and has been used for producing a LF Indicator through HELCOM. The information of stomach content is used in several projects and ICES groups, e.g. WGIAB, WGCOMEDA.

9. Extended comments (Tables 1G and 1H)

Table 1G: This survey is new for Sweden and started 2020. The plan was adjusted by WGBIFS in April 2021. The survey was conducted according to the new plan.

NORTH SEA AND EASTERN ARCTIC

IBTS Q1 AND Q3 – THE INTERNATIONAL BOTTOM TRAWL SURVEY

1. Objectives of the surveys

The main aim of the survey is to estimate abundance of recruitment of the target species cod, haddock, whiting, Norway pout, herring, sprat, saithe, plaice, mackerel and also non-commercial fish. Moreover, the otoliths of the commercial species are collected and subsequently analysed in order to assess abundance by age class, in particular for the recruiting year classes in the Skagerrak, Kattegat and small parts of the North Sea. The survey is included in Table 10 in EU-MAP.

2. Description of the methods used in the survey

This survey is conducted twice annually, in quarters 1 and 3. The French bottom trawl GOV is used for sampling demersal species in both quarters while in Q1 only, a MIK (Midwater ring net) trawl is used at night for sampling fish larvae. Sweden is assigned 46 hauls for the first quarter survey of which three have been allocated to the North Sea, and 45 randomly selected hauls for the third quarter survey in the Skagerrak and Kattegat. In 2020, according to IBTSWG and recommendations from WKNSIMP, Sweden is requested to increase the overlapping of squares to conform more to the present design of the IBTS, now particularly important in the light of introducing a new vessel. For both surveys hydrographical data are collected with a CTD in connection to the trawl hauls. Each haul is sorted and all species are recorded, length measured and weighed. For target species biological parameters are collected on fish length, age, weight, sex and gonadal maturity. In case of large catches subsampling is performed. Marine litter is registered from each haul.

Further details are explained in the International Bottom Trawl Survey (IBTS) manual:

Manual IBTS
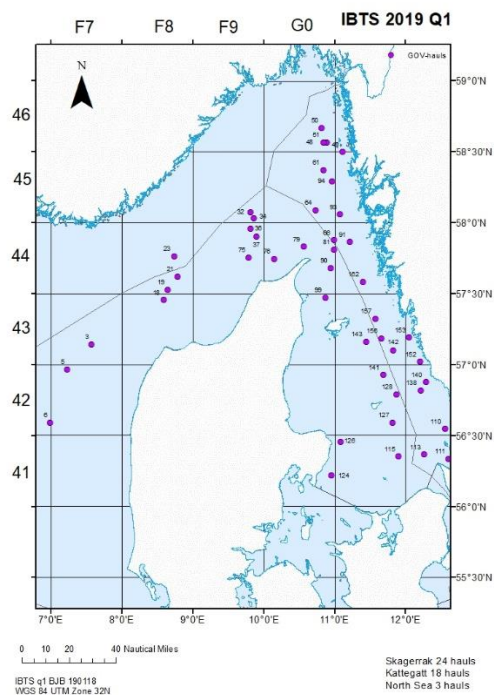
Map 5. IBTS first quarter survey 2019, illustrating the approximate spatial distribution of GOV demersal hauls for the survey in 2020 and 2021
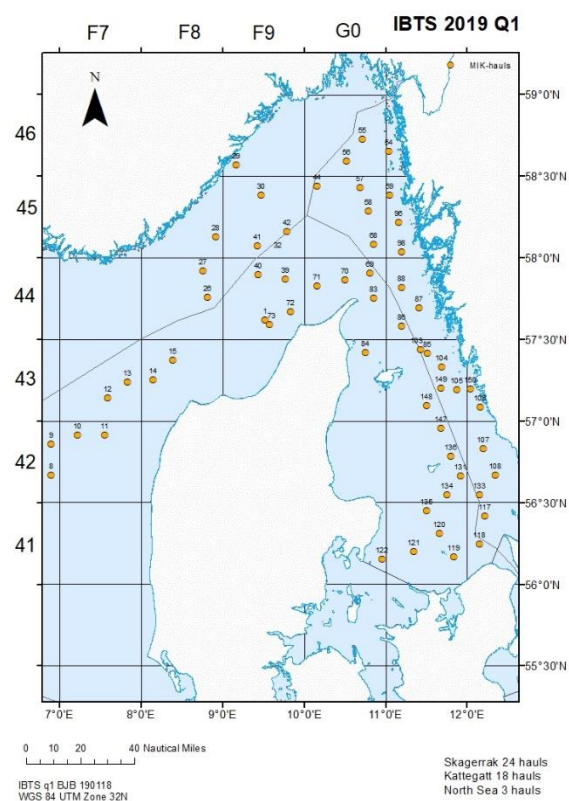
Map 6. Hauls with MIK larvae trawl during IBTS first quarter survey 2019 illustrating the approximate spatial distribution of hauls for 2020-2021.

Map 7. IBTS third quarter survey 2019, illustrating the approximate spatial distribution of GOV demersal hauls for the survey in 2020-2021.

3. Coordination and participation

Participating Member states in the surveys are: Sweden, Denmark, Germany, England, Scotland. The IBTS survey is coordinated by the International Bottom Trawl Survey Working Group (IBTSWG) and the data are uploaded to the international ICES database DATRAS. Data on marine litter is reported to the ICES marine litter database.

In 2020 Sweden will run IBTS from the new research vessel Svea. The introduction of a new vessel to the present design of the survey has been discussed in the IBTSWG and the WG has requested Sweden to increase overlapping in a number of statistical squares. The intention is to overlap in approximately 14 squares in the North Sea and the Skagerrak with both Denmark and Norway. The coverage is not entirely decided yet but the work is in progress. Sweden is therefore planning for three extra days compared to previous years to cover the larger area including extra steaming time.

4. **International task sharing (physical and/or financial) and the cost sharing agreement used**

No cost sharing agreement is applied for this survey.

5. **Explain where thresholds apply**

Share of Union TAC for target species is above 3%

6. Graphical representation (map) of the realized samples

Map 5. Hauls with GOV demersal trawl IBTS first quarter survey 2021
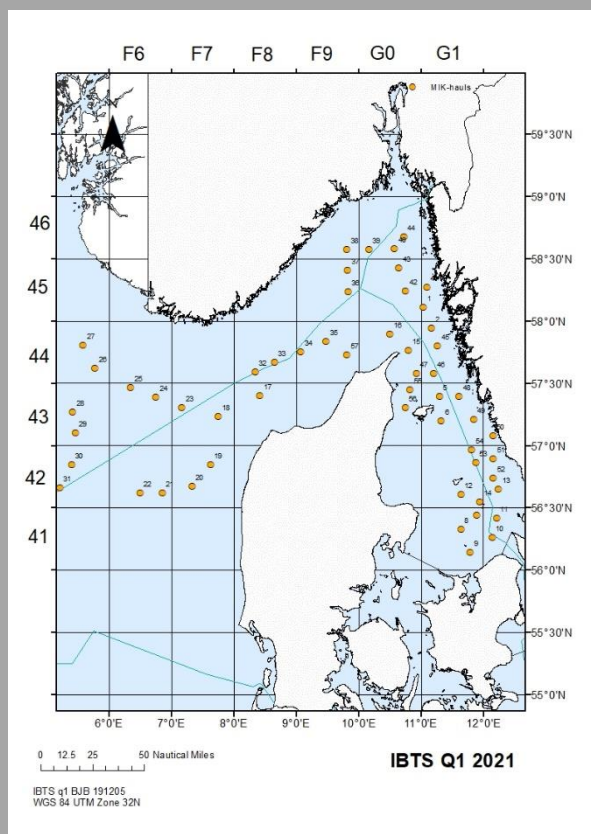
Map 6. Hauls with MIK larvae trawl during IBTS first quarter survey 2021.
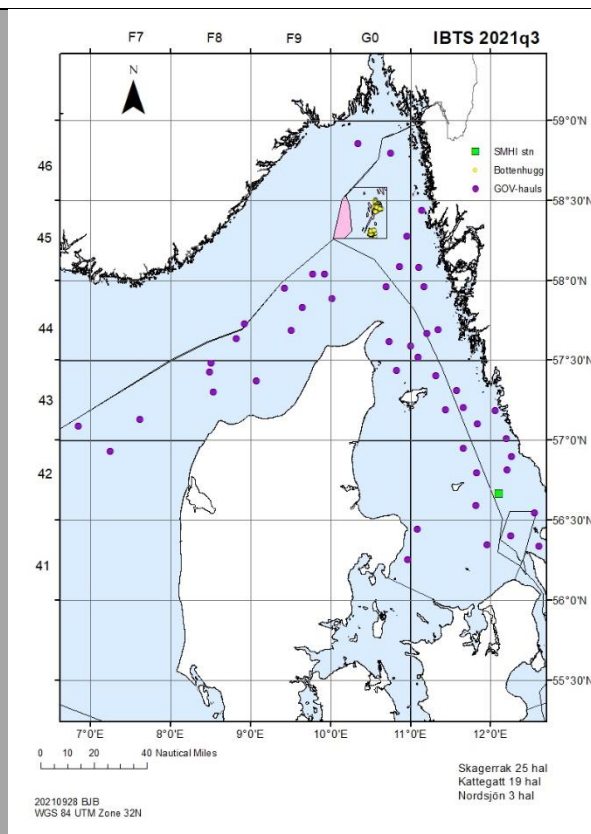
Map 7. Hauls with GOV demersal trawl IBTS third quarter survey 2021.

7. Link to the latest meeting report of the coordination group

The survey is coordinated by the ICES International Bottom Trawl Survey Working Group (IBTSWG). Link to the latest report:

https://ices-library.figshare.com/articles/report/International_Bottom_Trawl_Survey_Working_Group_IBTSWG_/18618368

8. Main use of the results of the survey

Indices for ICES assessment groups HAWG, WGBFAS and WGNSSK.
Litter is a MFSD-descriptor and used by OSPAR.

9. Extended comments (Tables 1G and 1H)

No additional comments.

NTV 3&4 – NEPHROPS TV SURVEY IN FUNCTIONAL UNIT 3 & 4

1. Objectives of the survey

The objective of the survey is to provide biomass estimates for mud-burrowing animals like *Nephrops*. The survey is included in Table 10 in EU-MAP.

2. Description of the methods used in the survey

The fishery independent Underwater TV survey is performed by having a video camera mounted on a sledge that is towed slowly (0.5-0.8 knot) on the bottom while recording the bottom surface. The video recording is analysed and *Nephrops* burrows are counted and converted into densities using information on the width of the view of the camera and length of the tow. Mean weight from biological samplings are used to estimate stock biomass. The manual for the survey, following the standard ICES survey protocol (SISP) can be found in final report of the Working Group on *Nephrops* Surveys (WGNEPS): Report WGNEPS
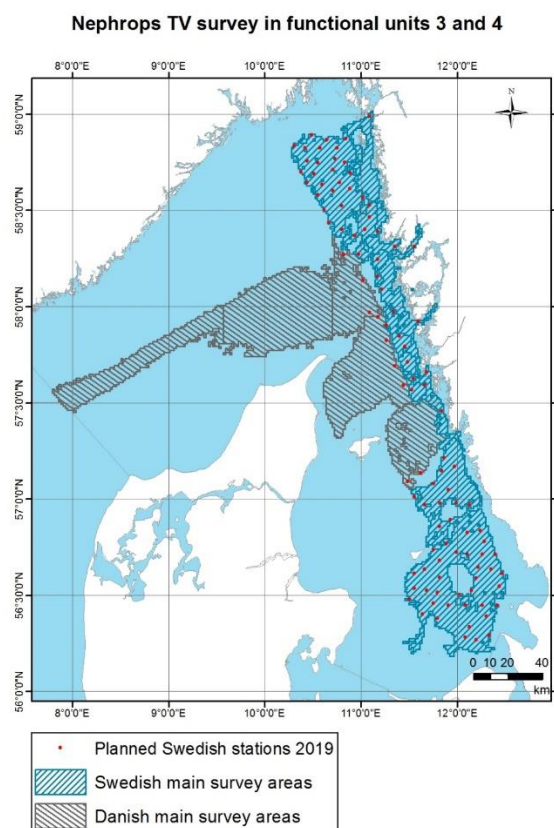
Map 8. Map showing the Nephrops tv (or under water tv UWTV) survey areas. Sweden and Denmark have divided the main responsibility for surveying in different parts or subareas (Danish main areas in grey, Swedish main areas in dark blue). The 2019 planned Swedish stations are shown in red to illustrate the spatial distribution of sampling stations and indicates the planned stations for 2020-2021.

3. Coordination and participation

The survey is a joint survey with Denmark. The survey area is divided into several subareas, where each country has the main responsibility for conducting sampling (see map 8. The future Swedish part of the survey is planned to be conducted using the new Swedish research vessel *R/V Svea*. The survey is coordinated by the ICES working group on Nephrops surveys (WGNEPS).

4. International task sharing (physical and/or financial) and the cost sharing agreement used

No cost sharing agreement is applied for this survey.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%

6. Graphical representation (map) of the realized samples
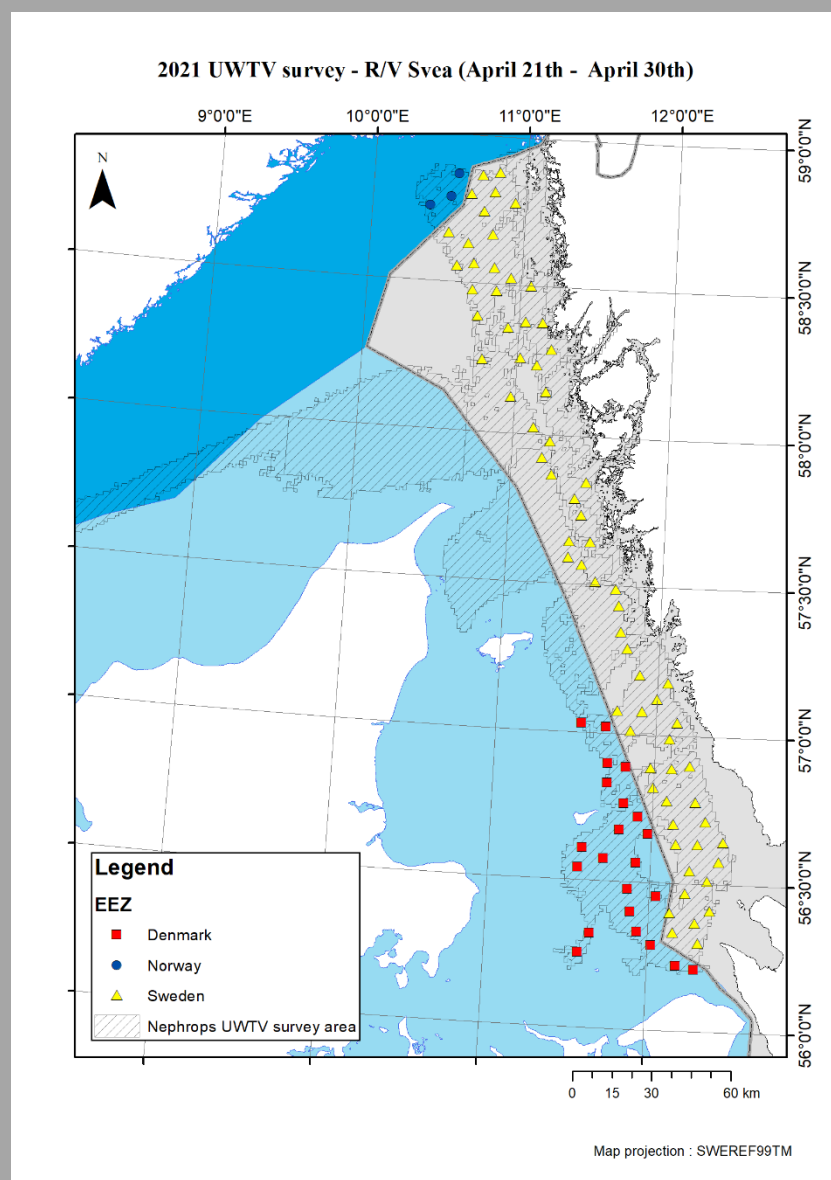
Map 8. Map showing the Nephrops tv (or under water tv UWTV) survey areas (striped area). Sweden and Denmark have divided the main responsibility for surveying in different parts or subareas. Swedish planned stations 2021 showed in map (colored by country EEZ). Sledge UWTV stations for Denmark and Sweden for the survey in 2021 in the defined sub areas of the *Nephrops* stock in IIIa.

All stations were visited but not all visited stations resulted in a density estimate due to high turbidity and low visibility, especially in southern Kattegat.

7. Link to the latest meeting report of the coordination group

The survey is coordinated by the ICES working group on Nephrops surveys (WGNEPS).
The manual for the survey can be found at final report of the Working Group on Nephrops Surveys (WGNEPS). Report WGNEPS

The latest *Nephrops* assessment results can be found at the final report of the on the North Sea, Skagerrak and Kattegat Working Group (WGNSSK).

Report WGNSSK

8. Main use of the results of the survey

The results are used to quantify the abundance of Norway lobster (*Nephrops norwegicus*) in the Skagerrak and Kattegat as an ICES recommended method for stock assessment of *Nephrops*, which is taken place in ICES WGNSSK.

9. Extended comments (Tables 1G and 1H)

No additional comments.

**International Ecosystem Survey in the Nordic Seas (ASH; alternative abbr. IESSNS**

1. Objectives of the survey

This survey is carried out in order to investigate distribution and migrations of the Atlanto-Scandian herring, blue whiting and other pelagic fish and to produce a biomass index for herring and a recruitment index for blue whiting for the ICES Working Group on Widely Distributed stocks (ICES WGWIDE). Furthermore, hydrographic conditions and plankton abundance in the Norwegian Sea and adjacent waters are monitored in order to investigate distribution and migration of herring and other pelagic fishes are influenced by environmental conditions. The survey is included in Table 10 in EU-MAP.

2. Description of the methods used in the survey.

The survey is collecting acoustic data, biological data like species composition and length measurements. For the target species herring and blue whiting data are collected on length, weight, sex, maturity and age (from scales of herring and otoliths of blue whiting). In addition, zooplankton hauls are made using a WP2 net and hydrographical data are collected using a CTD.
The sampling procedures are described in: ASH manual
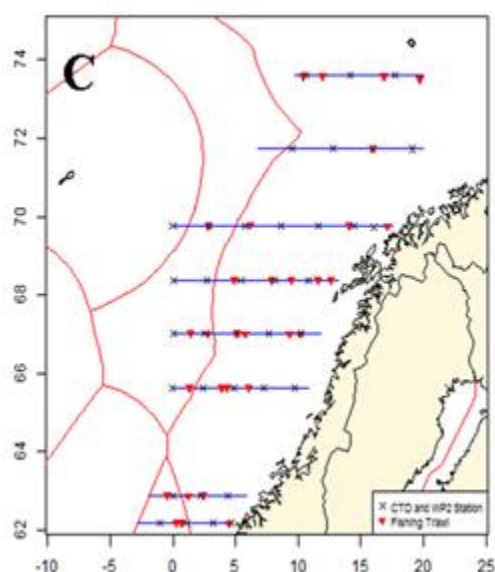
Map 9. Survey area covered in 2017 which indicate the area planned for 2020-2021.

3. Coordination and participation

The survey is carried out as a joint EU survey using the Danish vessel R/V DANA with participation of UK, Ireland, Netherlands, Germany, Sweden and Denmark. The survey is coordinated by the ICES Working Group of International Pelagic Surveys, WGIPS.

Denmark is responsible for reporting the data from the survey.

4. International task sharing (physical and/or financial) and the cost sharing agreement used

Cost share agreement is established for this survey, see table 7C for details.

5. Explain where thresholds apply

Share of Union TAC for target species is above 3%.

6. Graphical representation (map) of the realized samples

For details see Annual Report Denmark.

7. Link to the latest meeting report of the coordination group.

For details see Annual Report Denmark.

8. Main use of the results of the survey

For details see Annual Report Denmark.

9. Extended comments (Tables 1G and 1H)

For details see Annual Report Denmark.

Text Box 2A: Fishing activity variables data collection strategy

General comment: This box fulfills paragraph 4 of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under Regulation (EU) No 1224/2009 or where data collected under Regulation (EU) No 1224/2009 are not at the right aggregation level for the intended scientific use.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the data collection of fishing activity variables of Member States.

1. **Description of methodologies used to cross-validate the different sources of data**

Logbook data are automatically checked when filled in regarding completeness and also regarding logic. In
addition, random checks are performed later on catches landed compared to those sold and also given geographic positions compared to VMS data. The port inspection also checks and verifies logbook data for the specific trip when an inspection is performed. Finally there are also computerized routinely performed checks of the complete logbook data to find abnormal and exorbitant values for all trips.

Journal data are automatically checked when filled in regarding completeness and also regarding logic. Since
the data is on monthly bases no further checks can be done on administrational or field bases. There are
computerized routinely performed checks of the complete journal data to find abnormal and exorbitant values for all trips.

2. **Description of methodologies used to estimate the value of landings**

Value by vessel and trip is concluded by estimating average prices per year, month, subdivision, and gear (if
available). The system is dynamic in the sense that if a price does not exist on a certain level, e.g. price per
gear, price per subdivision is used instead. If a price for the subdivision is not available price per month is used instead.

3. **Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)**

Averages prices is calculated from tripdata by values (see 2.). Meaning that they are weighted on the amount
caught.

4. **Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)**

A complementary data collection is in place for vessels below 10 meters. The sample plan is census based and they report in a so called fishing journal instead of the standardized logbook. The journal is filled in once every month with a finite number of fishing trips per journal. If a fishermen have many fishing trips he/she have to fill in several journals each month to cover all of the fishing trips. Type of data collected are almost the same as the logbook, which means number of days, type of gear,

catch, spatial allocation etc. The data is not as detailed as the logbook data but it is sufficient for analysis and control purposes.

5. Deviations from Work Plan methodology used to cross-validate the different sources of data

No deviation.

6. Deviations from Work Plan methodology used to estimate the value of landings.

No deviation.

7. Deviations from Work Plan methodology used to estimate the average price.

No deviation.

8. Deviations from Work Plan methodology used to plan collection of the complementary data

No deviation.

Text Box 3A: Population segments for collection of economic and social data for fisheries

General comment: This box fulfils paragraph 5 points (a) and (b) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Tables 5(A) and 6 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the fleet socio-economic data collection of Member States.

1. **Description of methodologies used to choose the different sources of data**

There is no specific methodology when choosing the source of data. Economic data are available via balance sheets for each company. The balance sheet data is complemented by a postal census survey for all fishermen with a license. The survey is mandatory to fill in. Via the survey we obtain data on cost and capital variables as well as socio-economic data.

2. **Description of methodologies used to choose the different types of data collection**

All variables for economic and social data for fisheries will be collected in census. Data in registers at SwAM are available and used, and excess data needed, like some costs variables and capital values will be obtained in a census mail-survey to all fishermen with a license. Furthermore, social variables will be collected every third year, starting 2018, through a census mail-survey. It is mandatory to reply. The survey will be send by tradtional mail because it is the simplest and cheapest way. No e-mail addresses exist for the complete fleet and collection by phone is too expensive. Data on subsidies is included in the economic survey but also for cross-checking gathered from the databases on the EMFF at the Swedish Board of Agriculture. Other income, capital values, wages and salaries of crew as well as financial position is also gathered in census from the income tax declarations register of all vessel owners. This data is compiled by Statistics Sweden (SCB).

The inactive fleet will not be covered by the collection since they by definition doesn't have any costs related to fisheries. However, data is gathered on vessel characteristics, effort, which by definition is zero, and capacity (fleet indicators). By experience, the capital value and capital cost of the inactive vessels is similar to capital value and capital cost of active vessels. Therefore, capital costs and capital value is estimated from data of active vessels with the same main gear type as the inactive vessels used when they were last active and fishing.

3. **Description of methodologies used to choose sampling frame and allocation scheme**

All variables for economic and social data for fisheries will be collected in census.

4. **Description of methodologies used for estimation procedures**

The Swedish fishing fleet are rather small. Clustering is needed due to confidentiality reasons and therefore all estimations are done on clustered segment. Since the survey is done on all vessels, in census, re-clustering for analytical reasons can be done easily.

Missing data, due to vessels sold, vessel owners that passed away etc., will be taken care of by weighting and calculating weighted averages using days at sea.

An allocation key to allocate the total variable cost to the different cost variables is estimated through the questionnaire (census letter-survey). The concerned cost variables are energy costs, repair and

maintenance costs, variable costs and non-variable costs. Total costs from tax declarations are used to calibrate the results at the correct total level of costs to be used for the allocation key.

5. Description of methodologies used on data quality

Logbook data are automatically checked when filled in regarding completeness and also regarding logic. In addition, random checks are performed later on catches landed compared to those sold and also given geographic positions compared to VMS data. The fishery control also checks and verifies logbook data for the specific trip when a control is performed. Finally, there are also computerized routinely performed checks of the complete logbook data to find abnormal and exorbitant values for all trips.

Journal data are automatically checked when filled in regarding completeness and logic. Since the data is on monthly basis no further checks can be done on administrational or field bases. There are computerized routinely performed checks of the complete journal data to find abnormal and exorbitant values for all trips.

Survey data is checked by computerized routines for finding abnormal and exorbitant values. Tax register data are checked in numerous ways at the tax authority.

6. Deviations from Work Plan methodology for selection of data source

No deviation.

7. Deviations from Work Plan methodology to choose type of data collection

The economic data compiled by Statistics Sweden (SCB) has been slightly changed. Previously, this data has been presented in approximately 30 segments due to secrecy. Data is now available as micro data, which gives more accurate and reliable results on vessel level. Aggregated results does not differ significantly, due to the change from segment data to micro data.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

Since data from Statistics Sweden have a stronger confidentiality the presented clusters deviate from WP. The collection are still oncensus level yet the reporing are on cluster level for the reporting economic and social variables the vessels in segment MGPVL0012 are now included in segment DTSVL0012. The same is for vessels in segment DFNVL1218 which due to confidentiality are included in DFNVL1012. The Swedish fleet are decreasing in number of vessels which results in some changes in clusters over time. Yet, all the information is collected but reporterd under a diffetern cluster.

9. Deviations from Work Plan methodology used for estimation procedures

The estimation process regarding economic and social variables has been under development since 2018 and is still under development. Yet, the model and underlying estimation framework is the same for this year. The estimation method is taking into account more variables that can have an effect on the estimated variable. A regression method with predicted values are used which assumes linear estimation.

10. Quality assurance

10.1 Sound methodology

The data collection regarding economic and social data follow best practices and guidelines decided by expert groups, e.g. PIM-methodology regarding splitting of capital costs. Methodologies used are documented.

10.2 Accuracy and reliability

Throughout the whole data management process data checks are done frequently. Raw data are being processed before compiled to intermediate results. When intermediate results are produced, several extensive data checks are in place to assess and validate the data. Every error and correction/imputation is well documented and dealt with according to guidelines and best practices.

10.3 Accessibility and Clarity

Are methodological documents publicly available?

Yes

Are data stored in databases?

Yes

Where can methodological and other documentation be found?

https://www.havochvatten.se/en/swam/eu--international/international-cooperation/data-collection-framework-dcf/national-programs-and-annual-reports.html

Pilot Study 3: Data on employment by education level and nationality

General comment: This box fulfills paragraph 5 point (b) and paragraph 6 point (b) of Chapter III of the Annex Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (c) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Table 6 of the delegated decision on the multiannual Union programme.
General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).

Fisheries

The pilot study regarding fisheries is not applicable anymore due to the addition of the full scale socioeconomic questionnaire with a census approach. See section 3A:2 for more details.

Aquaculture

Pilot study regarding aquaculture is not applicable anymore due to an addition of the full scale socio-economic questions in the already existing questionnaire, with a census approach. See section 3B for more details.

4. **Achievement of the original expected outcomes of pilot study and justification if this was not the case.**

Fisheries

NA. Fully implemented in the standard data collection.

Aquaculture

NA. Fully implemented in the standard data collection

5. **Incorporation of results from pilot study into regular sampling by the Member State.**

Fisheries

NA. Fully implemented in the standard data collection.

Aquaculture

NA. Fully implemented in the standard data collection.

Text Box 3B: Population segments for collection of economic and social data for aquaculture

General comment: This box fulfills paragraph 6 points (a) and (b) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Tables 6 and 7 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.

1. **Description of methodologies used to choose the different sources of data**

Data will be collected by Statistics Sweden and Swedish board of Agriculture in three ways.

   a. Statistics Sweden: Income tax declarations from every enterprise whose main source of income (more than 50 %) comes from aquaculture will be compiled from official registers.
   b. Statistics Sweden: A questionnaire (Q1) about farming techniques, investments, production value and volume, costs that are not specified in the income tax declaration, social vaiables and mortality will be sent to all aquaculture enterprises.
   c. Swedish board of Agriculture: Data on subsidies will be collected from the Swedish board of Agriculture existing systems, the managing authority of the European Maritime and Fisheries Fund (EMFF), and will be compiled by Swedish board of Agriculture.

2. **Description of methodologies used to choose the different types of data collection**

Sweden has a production of over 1% of EU's total production but below 2,5% which gives us the possibility to collect social and economic data with a simplified methodology such as pilot studies with a view to extrapolate the data. Environmental data does not need to be collected according to current thresholds but we consider this information important and has decided to collect and report this data.

The reference data is Sweden's latest submission under Regulation (EC) No 762/2008 of the European Parliament and of the Council, and corresponding data published by Eurostat.

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency of final data. Quality of the data collected by Swedish board of Agriculture is secured by using existing system for disbursement.

3. **Description of methodologies used to choose sampling frame and allocation scheme**

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency of final data. Data on variables of production and data on the economic variables not included in the financial accounts (imputed value of unpaid labour, energy cost, livestock volume and cost, feed volume and cost, repair and maintenance, other operational cost, extraordinary cost) will be collected from answers from a questionnaire conducted by Statistics Sweden which ensures the consistency of final data. Data on subsidies will be compiled from existing system of disbursement.

Data is segmented according to table 9 (Commission implementing decision (EU) 2019/910 adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017-2019). However, Sweden has a small aquaculture industry and need to group species and techniques together due to confidentiality. With a reference to previously reported production the reported segmentation will be:

- Salmon, trout and other freshwater fish together under Hatcheries and nurseries (8:8).
- Other freshwater fish will be reported under
    - Ponds (8:1),
    - Tanks and raceways (8:2),
    - Recirculation systems (8:4) and
    - Cages (8:6).
- Mussels and Oysters will be reported together under Other (10:12) and
- Crustaceans will be reported under Other (13:12).

4. Description of methodologies used for estimation procedures

A questionnaire (Q1) about farming techniques, investments, production value and volume, costs that are not specified in the income tax declaration, social vaiables and mortality will be sent to all aquaculture enterprises. The questionnaire will make it possible to compare information on value of aquaculture production with declared income from income tax declarations. These comparisons are needed to be able to classify the aquaculture farming as main acitivty of the enterprise or not. Respondents result will be assigned to proper segment by Statistics Sweden.

5. Description of methodologies used on data quality

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency and quality of final data. Questionnaire is evaluated by Statistics Sweden. They conduct telephone interviews with aquaculture enterprises when there are incomplete answers, unreasonable answers or non-responses. Results are checked for bias. We intend to decrease previously biased results from questionnaires by our new methodolgy with just one questionnaire instead of two that is distributed on an enterprise level instead of facility. The quality of data on subsidies is evaluated by Swedish board of Agriculture by comparison with previous years disbursements and programme budget.

6. Deviations from Work Plan methodology for selection of data source

No deviations.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

The segment *Other freshwater fish Tanks and raceways* 8.2 has been added. 8.2 has also been aggregated with 8.4 *Other freshwater fish Recirculation systems* for variables due to confidentiality.

9. Deviations from Work Plan methodology used for estimation procedures

A new national regulation was introduced on the 03 december 2020. The regulation makes it mandatory to submit the information requested in the questionnaire which should lead to an

increased number of responses. The effects of this regulation have yet to show up in the data collected.

10. Quality assurance
10.1 Sound methodology

For questionnaire Q1 there is a quality report publicly available which describes methodology and quality assurance. All data collection follows practices agreed upon in expert groups.

10.2. Accuracy and reliability

Response rate and achieved sample rate are provided in Table 3B.

For Q1 data checks are done according to check lists following agreed routines for quality assurance within Statistics Sweden in cooperation with the Swedish Board of Agriculture.

For variables collected through financial accounts by Statistics Sweden the acieved sample rate is based on the quality of the data, the achieved sample rate calculated from this data was 50,59 % work is currently in progress to achieve an improved sample rate. Regarding variables for which data were obtained from questionnaires the corresponding achieved sample rate and response rate were 64,71 %.

10.3. Accessibility and Clarity

Are methodological documents publicly available?

Yes for Q1 a quality report is publicly available.

Are data stored in databases?

Yes

Where can methodological and other documentation be found?

At Statistics Sweden

Provide the web link, if documentation is publicly available

https://jordbruksverket.se/om-jordbruksverket/jordbruksverkets-officiella-statistik/jordbruksverkets-statistikrapporter/statistik/2021-08-31-vattenbruk-2020

SECTION 3: ECONOMIC AND SOCIAL DATA

Pilot Study 4: Environmental data on aquaculture

General comment: This box fulfills paragraph 6 point (c) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2 and Article 4 paragraph (3) point (d) of the Implementing Decision (EU) 2016/1701 on the format of

the WP. It is intended to specify data to be collected under Table 8 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).

Pilot study regarding environmental data on aquaculture is not applicable anymore due to an addition of the variable mortality to already existing questionnaire, with a census approach. See section 3B for more details. Data on treatments are collected through official records.

4. **Achievement of the original expected outcomes of pilot study and justification if this was not the case.**

NA. Fully implemented in the standard data collection.

5. **Incorporation of results from pilot study into regular sampling by the Member State.**

NA. Fully implemented in the standard data collection.

SECTION 3: ECONOMIC AND SOCIAL DATA

Text Box 3C: Population segments for collection of economic and social data for the processing industry

General comment: This box fulfils footnote 6 of paragraph 1.1(d) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme; and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Implementing Decision (EU) 2016/1701 on the format of the WP. It is intended to specify data to be collected under Table 10 of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.

1. **Description of methodologies used to choose the different sources of data**

The data presented comes mainly from official statistics that has been collected and processed by Statistics Sweden through the SRU register which is maintained by Statistics Sweden and consists of income tax declarations in Sweden. Part of the data will be collected from the Statistical Business Register which is a central register consisting of information on all registered enterprises in Sweden. It is also maintained by Statistics Sweden. Another part of the data will be collected from Labour market statistics, which is a central register that is maintained by Statistics Sweden.

2. **Description of methodologies used to choose the different types of data collection**

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data.

3. **Description of methodologies used to choose sampling frame and allocation scheme**

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. Data on two variables (energy costs and subsidies) will be collected from answers from a questionnaire sent out by Statistics Sweden based on PPS-selection in the Statistical Business Register. The questionnaire is used as a base for estimating an allocation key for

variables not included in the financial accounts. The sampling method for the variables collected with probability sample survey is Probability Proportional to Size (PPS sampling) where the sum of total income and total costs is used to select which enterprises that will be sampled. Data on one variable (unpaid labour) will be based on an expert evaluation made by the component authority Statistics Sweden. The reason for this is that there is not possible to use any regular data collection scheme for that variable.

4. Description of methodologies used for estimation procedures

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. Data on two variables (energy costs and subsidies) will be collected from answers from a questionnaire sent out by Statistics Sweden based on PPS-selection in the Statistical Business Register. The questionnaire is used as a base for estimating the variables (including energy costs and income from subsidies) not included in the financial account.

5. Description of methodologies used on data quality

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. The data quality evaluation is carried out by Statistics Sweden before delivering it to the Board of Agriculture, who conducts a macro evaluation upon delivery to ensure no abnormal or implausible changes have occurred by comparing the new data with previous years.

Sampled data is reviewed on a micro level by Statistics Sweden regarding summations, plausibility and relationships between variables. Outliers that may have a large effect on the estimation are checked and evaluated. Census data from the Swedish Tax Agency and the Statistical Business Register is evaluated by Statistics Sweden although not to such a large extent as sample data. The evaluation of census data mostly consists of reviewing suspiciously extreme values that may be small or large. After reviewing the data on a micro level the data is processed to correct for non-responses. After merging the census and sample data the aggregate is checked and evaluated at a macro level. In the last step no difference is made between sample and census data.

For variables, such as subsidies and energy costs, collected through the probability sample survey CV values are estimated to display the uncertainties due to sampling. A possible shortfall is that although data is collected, processed and ensured by Statistics Sweden, some variables are not available through financial accounts. The variables affected by this possible shortfall are subsidies and energy costs. The reason for this is that those variables were solely collected through questionnaires and there is a certain range of uncertainty of these variables and it is also difficult to control if they are correct. There are some shortfalls when it comes to subsidies, but it is not a good solution to obtain subsidies from the administrative records. The reason is that we are using Statistic Sweden's standardized method to obtain the financial information for the processing industry and we do not see that we have any option to change this method.

6. Deviations from Work Plan methodology for selection of data source

There are no deviations from the methodologies to choose type of data collecton scheme compared to what was planned in the Work Plan.

7. Deviations from Work Plan methodology to choose type of data collection

There are no deviations from the methodologies used regarding sampling frame and allocation scheme compared to what was planned in the Work Plan.

8. **Deviations from Work Plan methodology regarding sampling frame and allocation scheme**

There are no deviations from the methodologies used regarding sampling frame and allocation scheme compared to what was planned in the Work Plan.

9. **Deviations from Work Plan methodology used for estimation procedures**

There are no deviations from the methodologies used for estimation procedures compared to what was planned in the Work Plan.

10. **Quality assurance**

10.1 Sound methodology

The data collection follow methodologies, guidelines and best practices agreed in expert groups. All data was collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data.

It has been recommended that the variable "employment" should be given for certain predetermined age categories. Since our data has been derived from official statistics in central registers there are some minor deviations from recommended categories.

10.2. Accuracy and reliability

Response rate and Achieved sample rate are provided in Table 3C.

The achieved sample rate and respons rate is 100 % for variables collected through financial accounts by Statistics Sweden. Regarding variables for which data were obtained from questionnaires (energy costs and subsidies) the corresponding achieved sample rate is 12 % and the response rate 78 %.

Comprehensive validations were made during the compilation of the data and figures were cross checked with other data sources by Statistics Sweden, when possible.

10.3. Accessibility and Clarity

Are methodological documents publicly available? **YES**

Are data stored in databases? **YES**

Where can methodological and other documentation be found? **YES**

Weblink for publicly available documentation:

https://www.scb.se/hitta-statistik/statistik-efter-amne/naringsverksamhet/naringslivets-struktur/foretagens-ekonomi/

Text Box 4A: Sampling plan description for biological data

General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Implementing Decision (EU) 2016/1701 on the format of the WP and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the delegated decision on the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.

Sweden is moving towards statistically sound sampling scheme (4S) in the commercial sampling. Preparation of detailed descriptions of the sampling design for the different sampling schemes is one important part in this process.

Evaluation, development and improvement of the remaining sampling schemes are underway and Sweden will continue to develop and implement 4S data collection in 2020 and 2021.

This goal applies to all sampling with the exception of cases where end users may set other requirements. For example, eel sampling may have to be performed in a different way if the data needs are not possible to meet by commercial 4S sampling. This could be due to either fisheries management measures related to the Swedish national eel management plan or in case there are other objectives in the stock assessment that needs to be taken into account (cf. Council Regulation (EC) No 1100/2007 and Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL).

Specific uncertainties with regards to 2020/2021:

Baltic Sea demersal fisheries: at present there are temporary emergency measures in place (EU 2019/1248) to protect the eastern Baltic cod stock. These measures will have significant impact on the Swedish cod fisheries in subdivision 27.3.d.24-26 during Quarter 3 and Quarter 4 of 2019. At present (10/2019) it is not yet known to what extent those measures will continue throughout 2020 and 2021. The plan described below assumes situation for 2020 and 2021 will be similar to that registered in the first half of 2019 both in terms of management and industry response. The sampling plan will therefore need to be adapted if, e.g., emergency measures are maintained, altered and/or the industry changes its response to the situation (e.g., by re-directing fishing effort to other species or fishing areas).

Sampling of pelagic stocks: Adequate sampling of pelagic stocks is strongly dependent on the collaboration of the industry and other countries (e.g., to sample foreign landings). Sweden is presently revising its commercial sampling of small pelagics to better meet the requirement of 4S sampling. The aim is to achieve a regional sampling plan, supported by the fishing industry and other Member States, that allows for the random sampling of vessels and/or trips and improves coverage to both national and foreign landings. At present landings of Danish vessels in Swedish ports are sampled whenever possible and the landings of Swedish vessels in Danish ports are covered by a bilateral agreement.

BALTIC SEA

Scheme: Baltic at-sea

Purpose: At-sea Observer Programme for length, age, weight data of landings and discards of demersal species in the Baltic Sea (Subdiv 22-32)[1]

Main end-users: ICES WGBFAS; National fisheries management agency; Scientific research projects;

Design: <u>Multi-stage</u>

Main stratification: 2 fishery stratum (see details in Table 4A)

Temporal Stratification: Quarterly

Spatial Stratification: none (DemTrawlers in 22/29); 1 spatial stratum (DemNets in 23)

Stratum: SWE - Balt (at-sea) - Act – 22/29 – DemTrawl

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of vessels active in the Demersal trawl fishery in subdiv. 22 to 29 during previous year	Vessel	Quarterly	random draw from vessel list with unequal probability (probability proportional to number of trips) without replacement	4 (per quarter)
2SU	Hypothetical list of trips from vessel	Fishing Trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
3SU	Hypothetical list of hauls in trip	Haul	---	Census	Census
4SU	Hypothetical list of individuals caught in haul	Individuals	Species x Catch Fraction x Commercial Size Category Biology: also 1cm length classes	Length: Census (random sample if too large) Biology: Census (random sample if too large); sampling stops when trip goals are achieved	Length: all individuals Biology: COD BMS and discards: 5 otoliths and individual weights (per size class and trip)

---

[1] The sampling scheme complements sampling carried out in schemes "Baltic self-sampling" by extending data collection to additional stocks and discards of demersal trawlers and gillnets in subdivision 23

Stratum: SWE - Balt (at-sea) - Pass – 23 - DemNets

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year	Week	Quarterly	random sample from week list without replacement	Gillnets: 5 (per quarter)
2SU	List of vessels active in the gillnetter or longlines fisheries for demersal species in specific subdivisions during 2016	Vessel	---	random sample from quarterly vessel list without replacement	1 (per week)
3SU	Hypothetical list of weekly trips from vessel	Fishing trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
4SU	All boxes of catch kept during fishing trip	Boxes	Species x Catch fraction x Commercial Size Category	Census or "random" sample by observer	Cod Landings: size (1-3): all boxes (or a sample of boxes) size (4-7): 1 box Other species landed and discarded: all boxes
5SU	All individuals in the box	Individuals (individual length, weight and age)	None	Length: Census Biology: Random sample or census (depending on size category)	Length: all individuals in box Biology (per size): COD Sizes 1-3: all otoliths and weights COD Sizes 4-5: 20 otoliths and weights + all remainder fish only weight COD Sizes 6, BMS and discards: 20

					otoliths and weights + 20 fish only weight

Main limitations: Sampling per trip for ages and weights may not ensure proper spatial coverage of the most abundant size classes;

Expected difficulties: There is risk for refusals and changes in fleet activity related to landing obligation, emergency management measures on the baltic cod fishery, and other management measures; usage of random vessel lists in sampling the demersal trawl strata is statistically sound but may bring about low coverage in some subdivisions.

Expected coverage of target population (based on sampling targets and 2016-2018 average number of trips per strata):

- SWE - Balt (at-sea) - Act – 22/29 – DemTrawl: 2.2% (n=16)
- SWE - Balt (at-sea) - Pass – 23 – DemNets: 1.2% (n=20)

Scheme: Baltic self-sampling[2]

Purpose: Self-sampling programme for length, age, weight data of landings of demersal fisheries and catches of pelagic fisheries, including vendace, in the Baltic Sea (Subdiv 22-32)[3]

Main end-users: ICES WGBFAS; National fisheries management agency; Scientific research projects;

Design: <u>Multi-stage</u>

Main stratification: 13 fishery stratum (see details in Table 4A)

Temporal Stratification: Quarterly

Spatial Stratification: by subdivision (in passive gears) or set of subdivisions (in <u>active gears</u>)

Stratum: SWE - Balt (self) - Act - 22/29 - DemTrawl

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year	Week	Quarterly	random draw from week list without replacement	6 (per quarter)
2SU	List of vessels active in the Demersal trawl fishery	Vessel	---	Random selection from quarterly vessel list	4 (per week) (*)

---

[2] In most strata self-sampling is restricted to the selection of the samples with observers carrying out the identification of the catch, measurements and biological sampling
[3] The sampling scheme complements sampling carried out in schemes "Baltic at-sea" by, e.g., supplementing data collection of trawl catches of cod stocks

	in all Baltic subdivisions previous year				
3SU	Hypothetical list of daily landings of cod from vessel in week	Daily landing of cod	---	ad-hoc (performed by buyer)	1 (per vessel)
4SU	All boxes of cod landed in fishing trip	Boxes of cod	Commercial Size Category	ad-hoc (performed by buyer)	1 box (**)
5SU	All individuals in the box	Individuals (individual length, weight and age)	None	Length: Census Biology: Random sample or census (depending on size category)	Length: all individuals in box Biology: Sizes 1-3: all otoliths and weights Size 4: 20 otoliths and weights + 20 fish only weight Sizes 5-7: 10 otoliths and weights + 10 fish only weight

(*) to ensure coverage of areas with less activity, buyers are also instructed to deliver full samples from additional landings from rarer subdivisions, e.g., subdivision 24 whenever fleet activity occurs in that subdivision and vessels are not on the list;

(**) n=1 additional box is requested from sizes 1-3 from another vessel to ensure less frequent size classes are sampled.

Passive gear strata under SWE - Balt (self) – Pass – 23/25[4]

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year	Week	Quarterly	random sample from week list without replacement	Gillnets and Longlines: 5 (per quarter)
2SU	List of vessels active in the gillnetter or longlines	Vessel	---	random sample from quarterly vessel list	2 (per week)

---

[4] In subdivisions 26 to 29 the gillnet and longline fisheries are very reduced in so no strata have been defined.

		Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
		fisheries for demersal species in specific subdivisions during 2016			without replacement	
3SU		Hypothetical list of weekly trips from vessel	Fishing trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
4SU		All boxes of catch kept during fishing trip	Boxes	Species x Catch fraction x Commercial Size Category	Census or "random" sample by observer at the landing site	Cod Landings: size (1-3): all boxes (or a sample of boxes) size (4-6 and BMS): 1 box Other species landed and discarded: all boxes
5SU		All individuals in the box	Individuals (individual length, weight and age)	None	Length: Census Biology: Random sample or census (depending on size category)	Length: all individuals in box Biology (per size): COD Sizes 1-3: all otoliths and weights COD Sizes 4-5: 20 otoliths and weights + all remainder fish only weight COD Sizes 6 and BMS and discards: 20 otoliths and weights + 20 fish only weight

Stratum: SWE - Balt (self) - Act - 30 - DemTrawl

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort

1SU	Hypothetical list of **vessel*weeks from** vessels active in the fishery	Vessel*Week	Quarter	Systematic (every fourth week, randomly select the first week); vessels selected without replacement	3
2SU	Hypothetical list of trips	Trip	---	Ad-hoc	1 Trip
3SU	Hypothetical list of hauls in trip	Haul	---	Ad-hoc (selected by the fishermen)	1 haul
4SU	Hypothetical list of boxes	Box	---	20-25 kg unsorted	1 box
5SU	Individuals in the box	Individual	Species	Census (length of all species)	---

Stratum: "SWE - Balt (self) – Pass – 30" and "SWE - Balt (self) – Pass – 31"

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of vessels active in the gillnetter fisheries	Vessel*Month	Quarter	Ad-hoc	3
2SU	List of trips from fishermen	Trip	---	Ad-hoc	1 (month) In total 6 trips in one year
3SU	Catch of the trip	Box	Landings (20kg) and discards (5kg)	Ad-hoc (random)	1
4SU	Individuals in the sample (box)	Individuals	Species Biology (only Herring): Length stratified (half cm)	Census (all lengths measured) Biology: Random sampling within length	Length: all ind. Biology: 20 ind (otoliths, length (mm), weights, maturity, sex)

					class until quarterly goals are achieved	per size class and quarter

Strata under "SWE - Balt (self) - Act - 31 – Pair trawlers targeting vendace"

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year (Sept-Oct 5 weeks)	Week		Systematic (1st, 3rd and 5th week samples)	3 weeks
2SU	List of vessels (fishing in the area)	Vessels	Five fishing areas within subdivision 31	"Random" selection from vessel list	1 vessel pairs (per week/per area)
3SU	Hypothetical list of trips (from that vessel)	Trip landing		Ad-hoc (convenience)	1 (per vessel)
4SU	Hypothetical list of bins of the landed fish	Bin	Species Biology (only Herring): Length stratified (half cm)	From the middle of the landing	1 bin
5SU	Hypothetical list of 10 L bucket in the bin	Bucket 10 L	---	Ad-hoc	1 bucket
6SU	All individuals in the bucket	Individual (species, individual length, weight and sex)	All length and recorded 0.5 cm groups	Census	Length: all individuals in bucket
7SU	Vendace in the bucket	Individual (Weight of gonads, maturity, age)		Ad-hoc	65-70 in the bucket

Main limitations: lack of control over the sampling in self-sampling programmes requires significant *a posteriori* checks for sampling biases; In trawlers, the usage of random vessel lists in sampling of combined subdivisions (e.g., 22-29) is statistically sound but may yield low sample

size in some of the subdivisions; Passive gears in subdivision 27-29 (where only minor cod landings occur) are not covered in the sampling.

Expected difficulties: There is risk for refusals or changes in fleet activity related to landing obligation, emergency management measures on the Baltic cod fishery, and other management measures (e.g., temporal closures); Longline fisheries and gillnet fisheries in subdivision 24 are relatively limited making the sampling of this domain quite uncertain;

Expected coverage of target population (based on expected trips and 2016-2018 average number of trips per strata):

- SWE - Balt (self) - Act - 22/29 – DemTrawl: 13.0% (n=96)
- SWE - Balt (self) - Pass - 23 – Nets: 1.8% (n=40)
- SWE - Balt (self) - Pass - 24 – Longlines and Nets: 3.0% (n=40)
- SWE - Balt (self) - Pass - 25 – Nets: 1.8% (n=40)
- SWE - Balt (/self) - Pass - 25 - Longlines: 10.2% (n=40)
- SWE - Balt (self) - Act - 30 - DemTrawl: 5.4% (n=12)
- SWE - Balt (self) – Passive – 30 – Herring Nets: 0.7% (n=6)
- SWE - Balt (self) – Passive – 31 – Herring Nets: 2.6% (n=6)
- SWE - Balt (self) - Act - 31 – Vendace Pair trawlers: 2.6% (n=15)

Scheme: Baltic at-sea 2

Stratum KBWE2 and KBEE2/KBEE3

Scheme: Sampling is set up by contacting preselected fishermen. In connection with their silver eel pound net fishery, the fishermen sign up on a yearly basis for 1) a number of métier sampling trips and 2) collection of eel for stock sampling. Additionally, it is possible to sign up for recording effort and eel landings in a voluntary daily logbook. These data are a complement to the official landing statistics and may also include discards and seal- and bird-induced damage. Each fisherman can have several vessels. Observers choose which trip they visit the fishermen to perform the métier sampling. Set-up: 1 fisherman in SD 23, SD 25 and SD 27 respectively. In total, 8 métier sampling trips are planned.

Scheme: Baltic other (market stock specific)

Purpose: Stock-specific programmes for length, length-weight relationship, age, maturity and stock composition of commercial landings from herring and sprat stocks in the Baltic

Design: Multi-stage

Main end-users: ICES HAWG, ICES WGBFAS; National fisheries management agency; Scientific research projects.

Herring

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort

		Fishing trip x species	Quarter and Subdivision (24-29S; 29N-31)	ad-hoc selection by first hand buyer; it is requested that samples are spread out in quarter	8 to 10 Trips
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during year				
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, sex maturity, intestinal fat, nematodes ichthyophonus)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	400 individuals per Quarter and Subdivision (24-29S) 800 individuals per Quarter and Subdivision (29N-31)

Sprat

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during year	Fishing trip x species	Quarter and Subdivision (24-29S)	ad-hoc selection by first hand buyer	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer until sampling targets are attained	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, sex maturity)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling	500 individuals per Quarter and Subdivision

				targets are achieved	

Main limitations: Lack of control of selection procedures

Expected difficulties: Weather conditions and number of boats fishing can affect sampling in Q1 and Q4

Expected coverage of target population (based on average number of samples obtained in 2016-2018 and average number of trips per strata in 2016-2018):

- SWE - Balt (stock spec) - Act - 24 – HerSpr: 31.4%
- SWE - Balt (stock spec) - Act - 25 – HerSpr: 5.2%
- SWE - Balt (stock spec)- Act - 26 – HerSpr: 14.0%
- SWE - Balt (stock spec)- Act - 27 – HerSpr: 2.5%
- SWE - Balt (stock spec)- Act - 28 – HerSpr: 3.4%
- SWE - Balt (stock spec)- Act - 29 – HerSpr: 4.5%

Scheme: logbooks & journals, freshwater

Purpose: biological sampling for weight, length, sex, maturity, age and endoparasite (*Anguillicola crassus*) from the commercial freshwater eel fishery.

In addition to the biological sampling the official fishery statistics of landings (numbers and total weight) of all commercial freshwater eel fisheries is collected by Swedish Agency for Marine and Water Management (SwAM) from all licensed fishermen. Numbers and weight of caught eel are used in ICES stock assessment models.

Design: <u>Multi-stage</u>

Main stratification: 1 Strata (see details in Table 4A)

Temporal Stratification: annual

Spatial Stratification: none

Strata: Freshwater, Eel-Fresh

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Commercial eel fishery	fisherman X lake	NA	Representative eel fisherman in three varying lakes	1 fisherman X lake
2SU	Landings	Individual fish	1 cm length classes	Random sample	125 fish per lake (375 fish in total) are sampled for

					weight, length, sex, maturity, age and endoparasite *A. crassus.*

Main limitations: The mandatory statistics data is the catch and the corresponding effort, however with different resolution and aggregation depending on the lakes concerned. EU logbooks made for daily reports are not used for freshwater fisheries, instead freshwater catches are reported on monthly or annually basis depending on lake. Eel rescued from induced mortalities in hydropower installation through a Trap and Transport program are reported to SwAM by each fisherman as well as by the fisher's organization on behalf of the industry.

Individual size, stage, sex, age and prevalence of an endoparasite (*Anguillicola crassus*), are collected from eels sampled from the commercial fishery in freshwater as described in Table 1C.

Expected difficulties: Unreporting or misreporting of catches occurs to an unknown extent. Since journal reliability is dependent on correct reporting by fishermen, there is potential bias in data. Landings for commercial purposes and catch for Trap & Transport purposes have been mixed up, but must be separated for the assessment.

Expected coverage of target population: By altering sampling between different lakes, fishermen and year, most "eel lakes" will be covered within a number of years concerning sampling of biological variables. Expected coverage of the commercial fishery statistics of target population by lake is close to 100% (based on the mandatory fishing journals conducted by licensed fishermen, meaning that all catch and/or landings have to be reported).

NORTH SEA AND EASTERN ARCTIC

Scheme: NorthSea&EasternArtic at-sea or self-sampling

Purpose: Length, age, weight data of landings and discards of demersal species in Skagerrak (subdiv 20) and Kattegat (subdiv 21)

Main end-users: ICES WGBFAS, ICES WGNSSK, NAFO/ICES NIPAG; National fisheries management agency; scientific research projects

Design: Multi-stage

Main stratification: 8 fishery strata (see details in Table 4A)[5]

Temporal and Spatial Stratification: Quarterly (all fisheries); Subdiv. (in some fisheries, see table 4A-B)

Per strata

---

[5] Danish vessels landing *Pandalus borealis* in Swedish ports are sampled whenever possible.

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of vessels active in the fishery during previous year	Vessel	Quarterly	random draw from vessel list with unequal probability (probability proportional to number of trips; draw without replacement)	3-5 (per quarter dependent on stratum)
2SU	Hypothetical list of trips from vessel	Fishing Trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
3SU	Hypothetical list of hauls in trip	Haul	---	Census	Census
4SU	Hypothetical list of individuals caught in haul	Individuals	Species x Catch Fraction x Commercial Size Category (*) Biology: also 1cm length classes	Length: Census (random sample if too large) Biology: Census (random sample if too large); sampling stops when trip goals are achieved	Length: all individuals Biology: WIT landings: Otoliths and individual weights from a subsample of 5-10 kg per trip COD discards: 3 otoliths and individual weights (per size class and trip) PLE discards: 3 otoliths and individual weights (per size class and trip) WIT discards: 3 otoliths and individual weights (per size class and trip)

(*) in at-sea sampling of "SWE - SkaKat (at-sea) - Act - 20/21 – PanTrawlTun" and "SWE - SkaKat (at-sea) - Act - 20/21 – PanTrawlNoTun" reference samples from unsorted shrimps catches from the last haul are collected for validation purposes

Main limitations: Sampling frames used in some strata are defined in terms of both métiers and areas; Sampling for ages and weights may not ensure proper spatial coverage of the most abundant size classes;

Expected difficulties: There is risk for refusals related to landing obligation and other management measures; usage of random vessel lists in some strata is statistically sound but may bring about low coverage in some subdivisions.

Expected coverage of target population (based on expected trips and 2016-2018 average number of trips per strata):

- SWE - NorthSea&EasternArtic (at-sea) - Act - 20/21, IVa-c – PanTrawlTun: 1.7% (n=12)
- SWE - NorthSea&EasternArtic (self) - Act - 20/21, IVa-c – PanTrawlNoTun: 0.8% (n=12)
- SWE - NorthSea&EasternArtic (at-sea) - Act - 20 – NepTrawlGrid: 0.4% (n=12)
- SWE - NorthSea&EasternArtic (at-sea) - Act - 21 – NepTrawlGrid: 0.9% (n=12)
- SWE - NorthSea&EasternArtic (at-sea) - Act - 20 – MixTrawl: 1.2% (n=20)
- SWE - NorthSea&EasternArtic (at-sea) - Act - 21 – MixTrawl: 1.1% (n=16)
- SWE - NorthSea&EasternArtic (at-sea) - Pass - 20/21 – NepPots: 0.3% (n=12)
- SWE - NorthSea&EasternArtic (at-sea) - Pass - 21 – DemNets: 0.8% (n=20)

Scheme: NorthSea&EasternArtic other (market stock specific)

Purpose: Stock-specific programmes for length, length-weight relationship, age, maturity and stock composition of commercial landings from herring, sprat, cod and witch flounder stocks in the Skagerrak and Kattegat

Main end-users: ICES HAWG, ICES WGBFAS, ICES WGNSSK, NAFO/ICES NIPAG; national fisheries management agency; scientific research projects;

Design: <u>Multi-stage</u>

<u>Cod</u>

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of cod from target subdivision during year	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer until sampling targets are achieved. It is requested that trips are spread in time.	Variable
2SU	List of size categories of cod in fishing trip	Size category	---	ad-hoc selection by first hand buyer until sampling targets are	1 size category

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
				achieved. It is requested that size categories are spread across trips (i.e., only 1-2 size categories are sampled per trip)	
2SU	List of boxes in size category	Box	---	ad-hoc selection by first hand buyer until sampling targets are achieved	1 box (size 1 to 4) ½ to 1 box (size 5)
3SU	Cod individuals in box	Biology of individuals (individual length, weight and age)	---	ad-hoc selection by first hand buyer until sampling targets are achieved	All fish are sampled for weight and otoliths until the following quarter*subdiv targets are achieved: Size 1: 50 indiv. Size 2: 50 indiv. Size 3: 100 indiv. Size 4: 100 indiv. Size 5: 100 indiv.

Herring

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during year	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer	1 Box

3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, maturity, nematodes)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	650 individuals per Quarter and Subdivision

Sprat

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from subdivision during year	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer until sampling targets are achieved	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer until sampling targets are achieved	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, maturity)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	400 individuals per Quarter and Subdivision

Witch flounder

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips observed at-sea with landings of	Fishing trip x species	Quarter and Subdivision (20)	ad-hoc selection by observers until sampling targets are achieved	Variable

	witch flounder				
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection from unsorted landings	1 Box
3SU	Witch flounder individuals in box	Biology of individuals (individual length, weight, age, maturity)	---	Census or subsamples	100 individuals per Quarter and Subdivision

Main limitations: Lack of control over selection procedures

Expected difficulties: None

Expected coverage of target population (based on average number of samples obtained in 2016-2018 and average number of trips per strata in 2016-2018):

- SWE - NorthSea&EasternArtic (stock spec) - Act - 20 – HerSpr: 33.8%
- SWE - NorthSea&EasternArtic (stock spec) - Act - 21 – HerSpr: 22.4%
- SWE - NorthSea&EasternArtic (stock spec) - Act - 20 – Cod: 2.7%
- SWE - NorthSea&EasternArtic (stock spec) - Act - 21 – Cod: 6.7%
- SWE - NorthSea&EasternArtic (stock spec) - Act - 21 – Witch: 0.7%

All Schemes:

Data archiving: Secure SQL database and RDB.

Quality assurance: Checks are made on data entry by means of database internal validation and quarterly/annual checks using R-scripted routines and developments from fishPi WP4 (see also Table 5A); Data archiving and quality assurance procedures for catch data are performed by the responsible authority, Swedish Agency for Marine and Water Management (SwAM).

Age reading: Otoliths are aged according to ICES guidelines.

Estimation: Estimates are carried out largely following ICES guidelines (e.g., WKDRP, WKPICS, WGCATCH)

Quality: Data entry checks and database internal validation, quarterly and annual checks using R-scripted routines and developments from fishPi projects; No significant biases have been identified to date; Data are routinely accepted and used by end-users (namely ICES, STECF and SwAM).

Future improvements: Most sampling schemes were peer-reviewed by external experts between Nov/2016 and Nov/2018 resulting in the improvement of the statistical properties of some of the sampling schemes carried out in 2017-2019. A scheme-by-scheme work-plan for optimization and better approximating statistical sound sampling and estimation and end-user needs is currently being developed. When implementing changes priority will be given to the current stock-based sampling of small pelagics for which implementation of new designs and regional sampling is expected for 2021 onwards. With regards to eel sampling, reporting of effort should be mandatory.

The reliability of the journal data could be improved by reducing unreported and misreported catches. SwAM is continuously working on improving data reliability.

Deviation from the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701:

Deviations from the Work Plan

BALTIC SEA

Details on reason for deviations from the work plan by sampling programmes is described in the comment field of table 4A.

During 2021 there were several deviations from the planned aim because of the covid-19 pandemic. The pandemic affected all sea-sampling programmes to various degrees during most of the year and to some extent also the self-sampling sampling programmes. The main reason for this was national, regional and local recommendations to restrict encounters with other humans especially in indoor environment. Even if the Swedish vessels have an obligation to take observers on board when they are selected for sampling, aspects like the (old-)age of crew in the vessels, them being smaller or larger or having closed or open decks had to be considered to minimize the risks of covid-19 spreading, leading to variations in the achievement of sampling goals across fleets and quarters. Significant quota reductions and other management measures have remained in force to protect the Eastern Baltic cod [COUNCIL REGULATION (EU) 2020/1579 of 29 October 2020] that have furthermore or less put the demersal fisheries in the Baltic on a halt, a situation that continued to extend to its sampling. Furthermore, in 2021, the situation of Western Baltic Cod also worsened with drops of 34% and 46% in landings being registered in SD 23 and SD24, respectively. This situation, combined with the instability in sampling caused by the covid-19 pandemic, led to significant reductions in the ability of the weekly-based probabilistic sampling to capture the fishery.

The non-achievement of sampling objectives for herring and sprat in SD29 (stratum "SWE - Balt (stock spec) - Act - 29 – HerSpr") was due to the small number of trips made by the larger scale fleet in this subdivision (22 trips), which made it difficult to capture it under a probabilistic design. This division represented a relatively small amount (12%) of Swedish landings of herring and sprat in SD24-29.

For passive gears in SD31 targeting herring (stratum "SWE - Balt (self) – Pass – 31"), catches were very small (especially in Q3), which led to the cancelling of many sampling trips.

NORTH SEA AND EASTERN ARCTIC

Details on reason for deviations from the work plan by sampling programmes is described in the comment field of table 4A.

During 2021 there were several deviations from the planned aim because of the covid-19 pandemic. The pandemic affected all sea-sampling programmes to various degrees during most of the year and to some extent also the self-sampling sampling programmes. The main reason for this was national, regional and local recommendations to restrict encounters with other humans especially in indoor environment. Even if the Swedish vessels have an obligation to take observers on board when they are selected for sampling, aspects like the age of vessels crews, boats being smaller or larger or having closed or open decks had to be considered as a means to minimize the risks of covid spreading, leading to variations in the achievement of sampling goals across fleets and quarters.

Action to avoid deviations

BALTIC SEA

Routines for covid-19 and fieldwork were implemented that made it possible to attenuate the impacts of the pandemic in field work in some of the vessels selected for sampling.

In SD23 and SD24, when it was perceived, that probabilistic sampling was not being able to achieve sampling goals due to reduction in cod landings, ad-hoc plans were put in place to help to attenuate data limitation.

In the work-plan 2022-2024, an ad-hoc backup plan is considered (as a complement to the probabilistic plan) for the sampling herring and sprat in the central Baltic. The idea is that ad-hoc sampling is put in place and some samples still obtained if/when landings from a certain subdivision are perceived large and not being captured by the probabilistic alternative.

NORTH SEA AND EASTERN ARCTIC

Routines for covid-19 and fieldwork were implemented that made it possible to attenuate the impacts of the pandemic in field work in some of the vessels selected for sampling.

Text Box 5A: Quality assurance framework for biological data

General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. Use this box to provide additional information on Table 5A of the Annual Report.

Evidence of data quality assurance

Data quality in all steps of the data collection has been under development for a number of years, in many international fora eg. PGDATA, WGCATCH, WGBIOP. Standards, procedures and quality control in sampling are also under constant development on a national level. Comprehensive quality control work is in place for most sampling schemes and work is going on to document these designs and processes. The documentation that is ready is made available at a public website, but there is still work to be done before this documentation is ready.

Some actions taken to improve the quality assurance framework during 2021 in Sweden are the following:

- Sweden plays an active role in the RDB-SC (co-chairing the group) and is contributing heavily in the RDBES core team group. The RDBES will have huge impact on the development for MS to move towards statistical sound sampling, increase transparency in estimation of input values for stock assessment and therefore improve the overall data quality.
- Sweden uses developed r-scrips for screening the national data for errors. The scripts are systematically used for more and more sampling types and the plan is to implement the routine for all sampling types.
- A Swedish quality project is ongoing since many years at SLU (Swedish University of Agricultural Science) in which SLU Aqua is participating. The aim is to achieve quality standards on data collection, data storage, data handling and to make data available.

Sampling design

- All sampling schemes are documented. With a few exceptions for the sampling of eel and salmon, where work is in progress and in 2021, the documentation has been improved further, and for multiple sampling schemes completed (see Table 5A).

Sampling implementation

- Market stock specific sampling of cod, sprat and herring: There is no protocol for recording non-responses and refusals as the samples for cod are taken at a fish auction where any sample can be chosen. For other sprat and herring samples, a routine is set up.
- Salmon: Recreational surveys: Main constraint is that most catches are estimated from voluntary reports. There is neither a registration of nor reporting requirements for recreational fishermen in Sweden and therefore, the reporting of catches is generally on a voluntary basis.

Data capture

- Most data captures have documented quality checks. The ones made automatically in the database Fiskdata2 are e.g. found on the webpage https://www.slu.se/qualityassurance but the quality checks made with developed R-scripts are still only available on an internal server.
- Cooperation within ICES working group on Nephrops (WGNEPS) resulted in a published manual for NTV3 & 4 (filming of lobster burrows) in 2021.
- Links to manuals at ICES are updated.
- Salmon: For sampling performed by external consultants (e.g. the counting of ascending adults in rivers) this documentation can be found on their public websites.
- Silver eel escapement, designated rivers: Quality checks to validate migration data is performed by Fiskevårdsteknik AB. Migration monitoring data from the eel trap and fish counter is available at https://fiskdata.se/raknare/index.php.

Data Storage

- Most data are stored in two major national databases, Fiskdata2 and Sötebasen. When demanded and if possible, data are also uploaded to and stored in, international databases. Work is in progress to make all relevant data that not are yet public, available on a webpage.
- NTV3 & 4 (filming of lobster burrows) lack both a national and an international database. Discussion have been going on for many years within ICES and the working group WGNEPS, but no solution is there yet. As the raw data is video film an international database for that may not be relevant, but the results may be of larger interest to store in a shared place. As long as there is no common solution, data is stored and backed up at SLU Aqua. The routines for storing raw data have improved in 2021.
- Salmon: In 2021, the development of the local national database at SLU Aqua (named FishDB) storing recent and historically data from the recreational River catches survey continued. No international official database is yet in practice for recreational catch data. Instead, these data are delivered to WGBAST and WGNAS and hosted by the WG in (read-only) Excel format. Nor for salmon life stages data (riverine sampling), there is yet an international database. These data are processed nationally and then delivered directly to WGBAST and WGNAS.
- Recreational fisheries- postal questionnaire: This survey is managed by SwAM and stored in their data warehouse. Data are used in the stock assessment work. There is no international database (yet).
- Eel: Data on eel are stored in the national database Sötebasen. Currently, data on recruitment and restocking is being imported into Sötebasen. Data from the designated river is available at fiskdata.se. Electrofishing data for eel is kept in SERS. Processed data is submitted to Ices WGEEL via yearly data calls. The data from coastal eel surveys and commercial sampling is stored in the national database KUL.

Data processing

- Processes to evaluate data accuracy and methods for editing and imputation has developed a lot during 2021, partly through international cooperation.
- Salmon: In 2021, further improvements regarding documentation have been made especially for data processing. Work to make the documentation publicly available is on-going (see Table 5A).

Text Box 5B: Quality assurance framework for socioeconomic data

General comment: This box fulfills Article 5 paragraph (2) point (b) of the Implementing Decision (EU) 2016/1701 on the format of the WP. This box is intended to specify data to be collected under Tables 5(A), 6 and 7 of the Annex of the Delegated Decision (EU) 2019/910 on the multiannual Union programme. Use this box to provide additional information on Table 5B of the Annual Report.

Evidence of data quality assurance

Fishing fleet

The methodology used to assure the quality of the data is divided in sections, from initial data collection to final product for the end user. Data is checked in the initial stage on a daily and monthly basis depending on the form of the data (logbook or journal). Checks are performed automatically and manually within the control unit at SWaM. In the intermediate process where data is aggregated and compiled, a second data check is carried out with a time-series perspective, finding anomalies over time. Questionnaire data are cross-checked with transversal data for plausibility reasons. Data is checked when finalized, both with internal data assurance tools but also via DV-tool provided by JRC/STECF. Furthermore, data issues are cross-checked by another MS at the first session writing Annual Economic Report. All data checks are performed with statistical programs such as Excel and Stata (hard checks) but also more soft checks done by an expert.

No N is indicated in table 5B.

Aquaculture

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency and quality of final data. For Q1 data checks are done according to check lists following agreed routines for quality assurance within Statistics Sweden in collaboration with the Swedish Board of Agriculture. No N is indicated in table 5B.

Fish processing

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. The data quality evaluation is carried out by Statistics Sweden before delivering to the Board of Agriculture. The Board of Agriculture conducts a macro evaluation upon delivery to ensure no abnormal or implausible changes have occurred by comparing the new data with previous years. No N is indicated in table 5B.

Section P3 Impartiality and objectiveness

Not applicable.

Section P4 Confidentiality

Not applicable.

Section P5 Sound methodology

Not applicable.

Section P6 Appropriate statistical procedures

https://www.havochvatten.se/en/swam/eu--international/international-cooperation/data-collection-framework-dcf/national-programs-and-annual-reports.html

Section P7 Non-excessive burden on respondents

Not applicable.

Section P8 Cost effectiveness

Not applicable.

Section P9 Relevance

Not applicable.

Section P10 Accuracy and reliability

Not applicable.

Section P11 Timeliness and punctuality

Not applicable.

Section P12 coherence and comparability

Not applicable.

Section P13 Accessibility and Clarity

Not applicable.